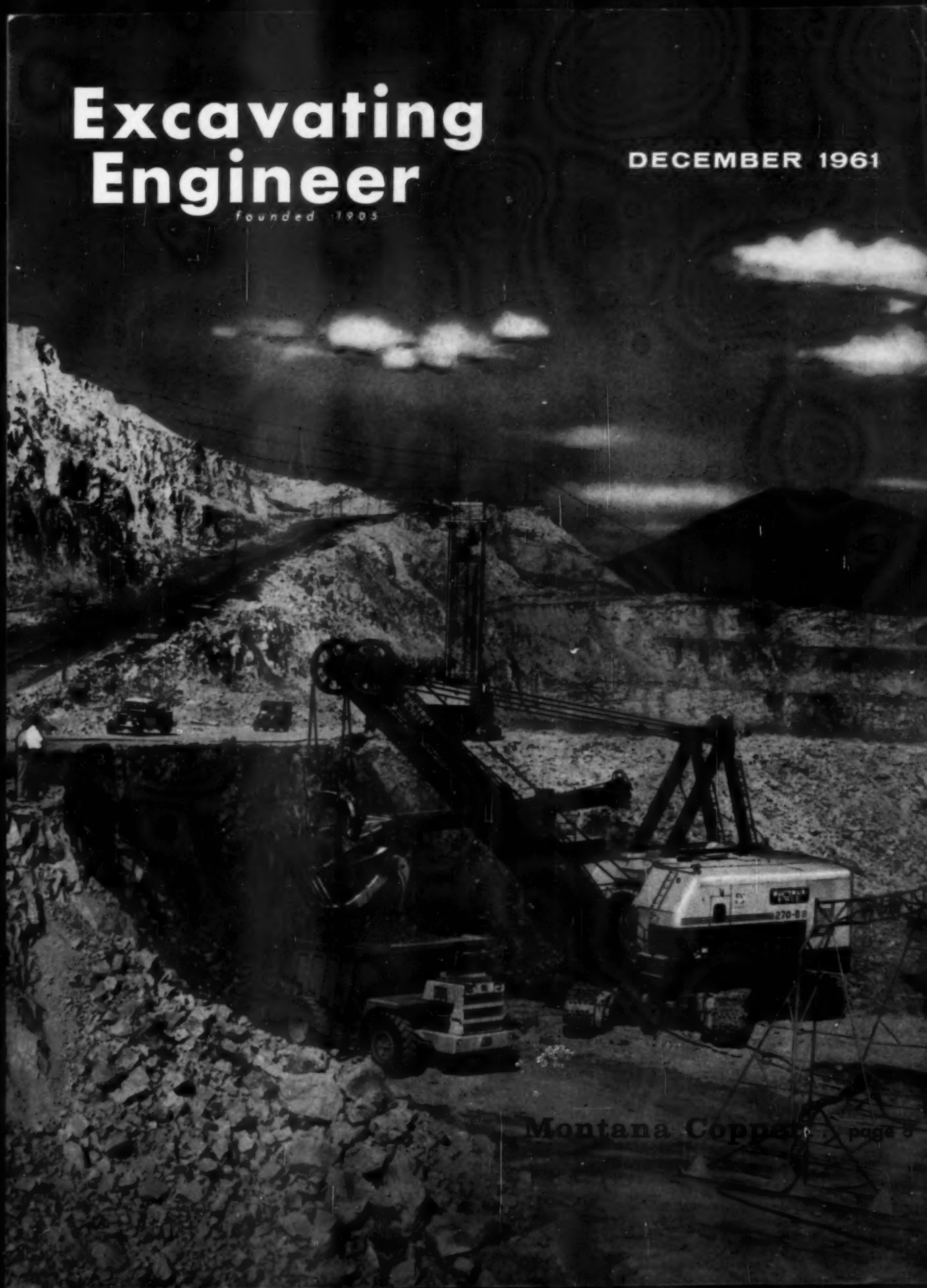
Excavating Engineer

founded 1905

DECEMBER 1961



Montana Copper ... page 5

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CONTENTS

Volume 55 No. 12 **December 1961**

Montana Copper—

It's Still 'The Richest Hill on Earth' 8

Butte's Berkeley Pit ushers in ultra-size equipment as traditional advancements in hard rock mining continue.

Efficiency Is a Measure of Maintenance 20

How will it reduce down time, cut costs and increase production? This well-thought-out program answers these questions positively.

Texas Highway Structure—

Becauseway 23

Because it was badly needed, they built it. Because it was built, the contractor handled 156-ton loads. Because he was ingenious, the job succeeded.

Causeway Withstands Wrath of Hurricane Carla 28

1,000-Ton Shovel Moves 12 Miles with Portable Power 30

Truax-Traer Coal Co. moves 950-B stripper from its Pinckneyville (Ill.) No. 2 mine to Elkville No. 1 in 26 days of travel.

Not in the Contract 33

News from the Field 34

Harvey Slocum Dies at India's Bhakra Dam 34
Moles Announce Award Winners 38
California's Trinity Dam is Dedicated 38
Big 11-yd. Dippers Dig Taconite 38

New Trade Literature 40

Equipment You Ought to Know About 41

Classified Ads 46

Advertisers' Index 50

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NEW METHODS, NEW MACHINES PUT SECTIONS OF INTERSTATE

40% AHEAD OF SCHEDULE...

Tandem loading with new power shift D9G speeds job for Greer Bros. & Young

The job is a big one: 5,000,000 yards to be moved on two adjoining sections of Interstate 75, just out of Jellico, Tenn. Terrain: hilly. Haul distance: 1600 feet. Soil: mostly clay and shale, with considerable ripping required. Time schedule: 300 days.

The London, Ky., firm has teamed new machines with new methods to meet the challenge. For example, the use of tandem pushers has resulted in 21 bank-yards (on adverse grades) in .6 to .8 of a minute. In this case, a new 385 HP Cat D9G Tractor was used in tandem with a D8H to load out new Cat 631 Tractor Scrapers.

"Tandem loading production has been boosted 25% with this D9G, as compared with an older torque converter D9," reports W. C. Howard, chief engineer on the job.

"We notice a big difference in power, weight and traction with this new machine. Cushion bulldozer and push block help, too. They give us on-the-go scraper contact—this cuts down on approach time. By reducing contact shock, we expect better scraper life. Tandem loading with the new D9G has helped us pull 40% ahead of schedule."

The new D9G has a number of pluses that make it right for dozing and ripping, as well as pushing. Here are only a few:

Engine delivers 385 flywheel HP—100 more horsepower than the first D9 . . . weight is 64,800 pounds, 14% more than the first D9 . . . a massive, heavy-duty undercarriage lets the D9G take on the toughest ripping job . . . a power train with built-in ruggedness also has unit construction for fast servicing.

The D9G has Torque Divider Power Shift as standard equipment. This exclusive Cat feature combines the efficiency and snap of direct drive with the load-matching and anti-stall characteristics of torque converter. A single lever gives the operator finger-tip control of his machine. It means faster cycle times and greater efficiency. You get more out of the machine all day.

There's only one way to evaluate the D9G. Check it on the job. Your Caterpillar Dealer will be glad to make arrangements.

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Greer Bros. & Young also use the D9G, equipped with 9C Dozer, to clean up the cut.

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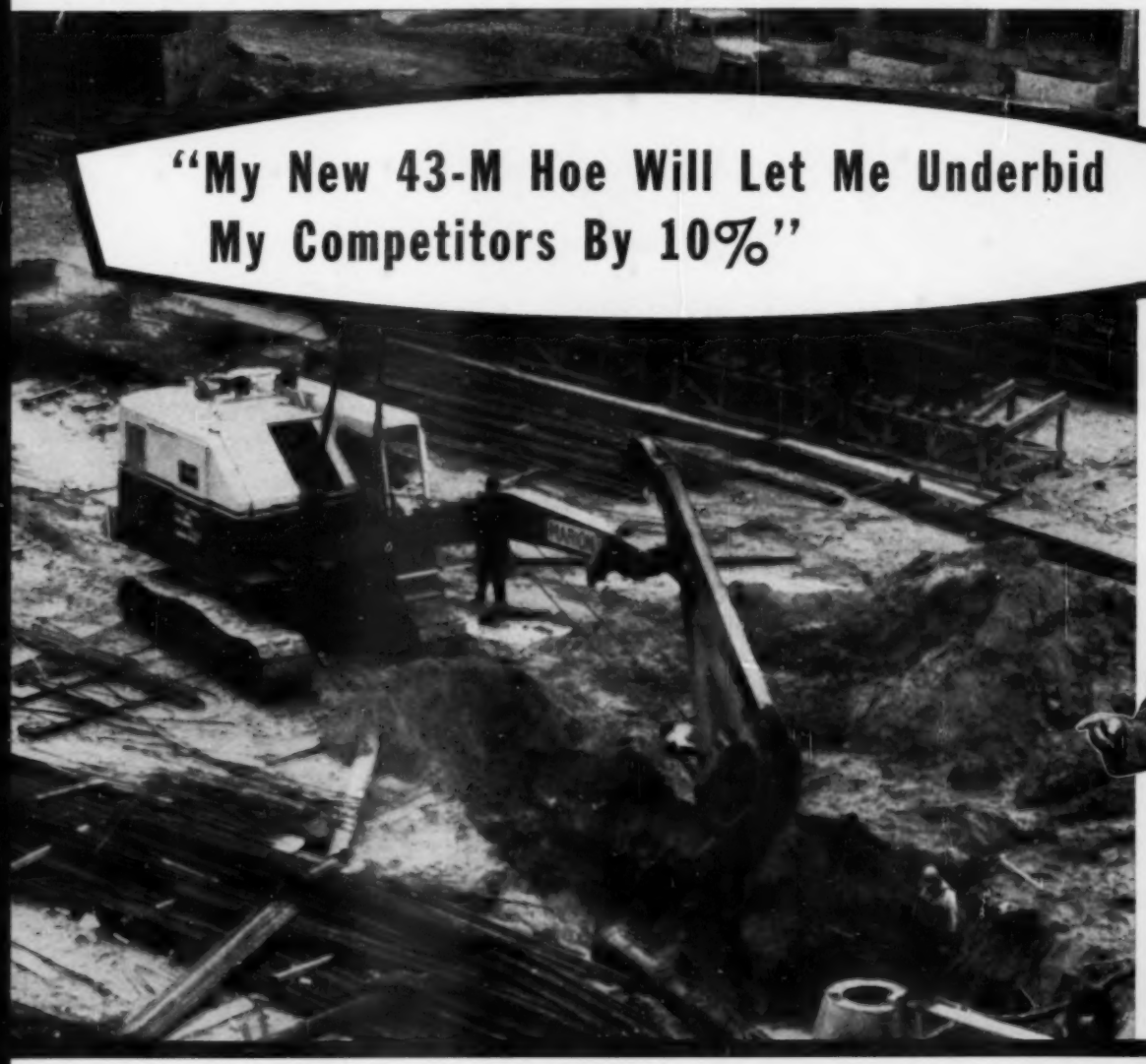

JOB FACTS: *Job Location — Far Rockaway Beach, New York. Project — $140,000 subcontract to dig trenching for $22,500,000.00 community center development. Average Trench Dimensions — 5' deep x 5' wide. Total No. of Linear Feet — 57,000. Conditions — Sandy soil with watertable encountered 2' below surface. Reinforced 3' square concrete beams laid over 6" steel pilings driven to 100 feet because of soil and moisture.*

"And, that's only part of the story," continued Frank Marino, president of the Frank L. Marino Corporation, Brooklyn, New York.

"I'm already saving five man-hours per week on maintenance, and it will cutdig any of our other rigs by at least 40 feet of trench an hour. I estimate the Marion, due to increased production over other equipment on the job, will have paid for itself in less than two years. As a matter of fact, I'm considering trading in another backhoe on this job and purchasing another Marion."

Mr. Marino's brother, Jerry, operates the Marion. He comments: "The 43-M has plenty of economical power. I've been working heavy equipment for 29 years and the Marion 43-M is one of the easiest to handle, most powerful and economical machines I have ever operated."

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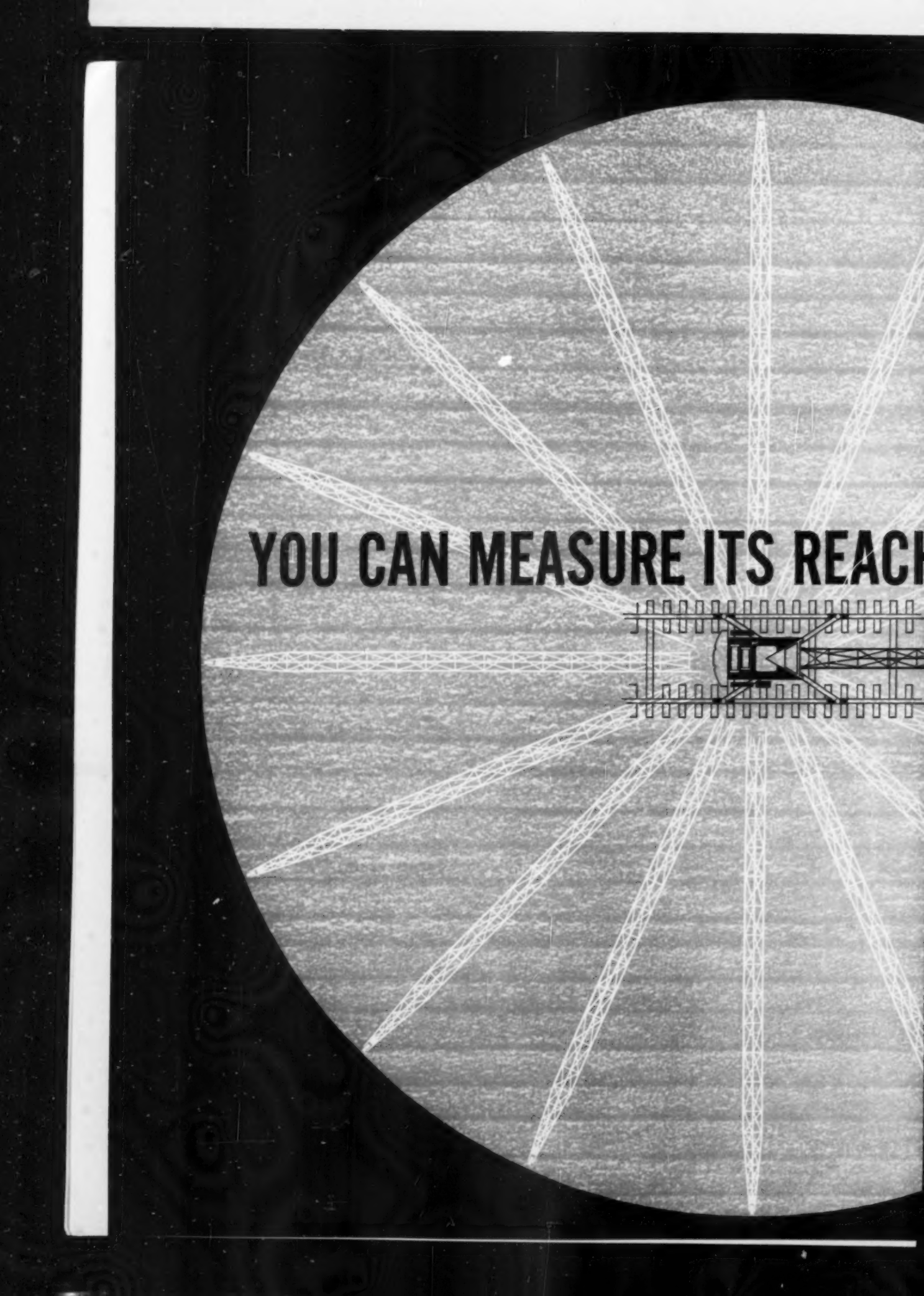
YOU CAN MEASURE ITS REACH

BY THE ACRE

Here you have a helicopter view of the Bucyrus-Erie Mark I-50 Tower Crane. The circle its boom describes at maximum reach covers an area of 47,529 sq. ft. — considerably larger than an acre. Diameter across the circle is 246 ft. You can pick up a load from any spot and deliver it to any spot within this area. No need to rehandle material. Rail mounted, the Mark I-50 lets you pick and propel with the crane's full rated capacity as you hoist and swing and boom up and down.

Another way to measure the size of the Mark I-50 is to compare its productivity with any other tower crane, built *anywhere.* Nothing touches it for speed, capacity, or money-saving ability on large building projects. 5T61

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MARK I-50

TOWER CRANE

It's Still 'The Richest Hill on Earth'

Butte's Berkeley Pit ushers in ultra-size equipment as traditional advancements in hard-rock mining continue.

by Ray Day

SHOVEL equipment that scoops 15 cubic yards at a bite, coupled with enormous off-highway haulers which regularly carry 63-ton payloads, are the latest mining advancement in the Anaconda Company's Berkeley Pit at Butte, Mont. Coupled with high-speed rotary drilling, operations at Berkeley today exemplify the trend toward not only the open-pit method, but bigger equipment in open pits.

Since the Berkeley open-cut was started in 1955, an estimated 142 million tons of material have been removed. That's being stepped up to an even greater pace now, considered on a daily basis. At the present time, company-owned and contract equipment in the pit are removing about 150,000 tons of material daily, including ore. Ore production is now between 30,000 and 33,000 tons daily. On occasion it has reached peaks of 46,000 tons.

The big earthmoving job is a combined undertaking, split as follows:

The principal stripping job, consisting of about 250 feet of worthless reddish-brown rock, has been let on

FIFTEEN YARDS of overburden at a swing, moved by F & S Contracting's new 270-B Bucyrus-Erie shovel, fill LeTourneau-Westinghouse Haulpak unit in three passes.

LES SHERIDAN, president of F & S Contracting Co., directs field operations on the Anaconda stripping contract. He made the decision to move up to a 15-yd. shovel.

ROAD MAINTENANCE, an important part of mining, is exemplified in the Berkeley pit where trucks haul over adverse grades as steep as 7%.

a contract basis to F & S Contracting Co. of Butte. According to Anaconda officials, this method has several advantages. First of all, it placed the excavation of large quantities of material in the hands of a specialist in that field. Because stripping is a shorter term undertaking than mining, it permitted large quantities of work to be done without the investment of Anaconda funds for stripping machinery. F & S has invested about $4 million in its pit construction equipment.

Ore Zone

The 200-ft. thick layer of gray rock, lying beneath this stripping, is made up of low grade copper ore and waste in approximately equal amounts, which is being handled by the Anaconda Company's crews and equipment. Equipment owned by Anaconda and by F & S is fairly similar throughout the pit.

The similarity even extends to two new types of haulers never seen before. F & S Contracting Co. and Anaconda each are experimenting with an electric truck. Anaconda's unit, made by R. G. LeTourneau, Longview, Tex., consists of a 60-ton rear-dump vehicle with a maximum speed of 25 mph. It is capable of turning around completely in less than its own length. This unique hauler has a 400-hp electric motor driving each wheel, eliminating such standard truck mechanical parts as transmission, clutch, differential and axles. Using electric power from an overhead trolley, the unit is expected to handle 60-ton payloads hauling up a 15% grade at a speed of about 12 to 15 mph. The unit is also equipped with diesel engines big enough to help the

EXTENT of high spoil banks shows here as a truck dumps a load of stripped rock off the edge.

COMPARATIVE SIZE between a 15-yd. dipper and LeTourneau-Westinghouse Haulpak 60 truck is shown here. Truck engine is protected against dust by a 32-tube Farr dry-type filter.

truck maneuver, dump, and move in around the shovel for reloading, after it's off the trolley line. F & S's experimental truck, made by Electro Truck, Inc., is diesel-electric only and is not equipped with a trolley.

A quick look at F & S Contracting Co.'s operations could easily be a preview of big scale excavation to come.

First in the line come three Bucyrus-Erie 40-R rotary drills. These modern self-powered and self-propelled machines are drilling 40-ft. deep holes, nine inches in diameter on average spacing of 18 feet. Drilling the holes 40 feet deep carries them six feet below grade, so that better control of the bench floor is assured at all times.

Hughes W7R and Type H drill bits are being used. As rock formations go, this one isn't particularly tough and the rotary bit gives good, clean holes at an average drilling rate of 80 feet per drilling hour. The 40-R's have turned in 1,000 feet of drilling in an 8-hour shift, but that was in shallow work where an extra drill pipe wasn't necessary. On 40-ft. work being done today, of course, an extra drill pipe is added to make the hole.

Lower Powder Costs

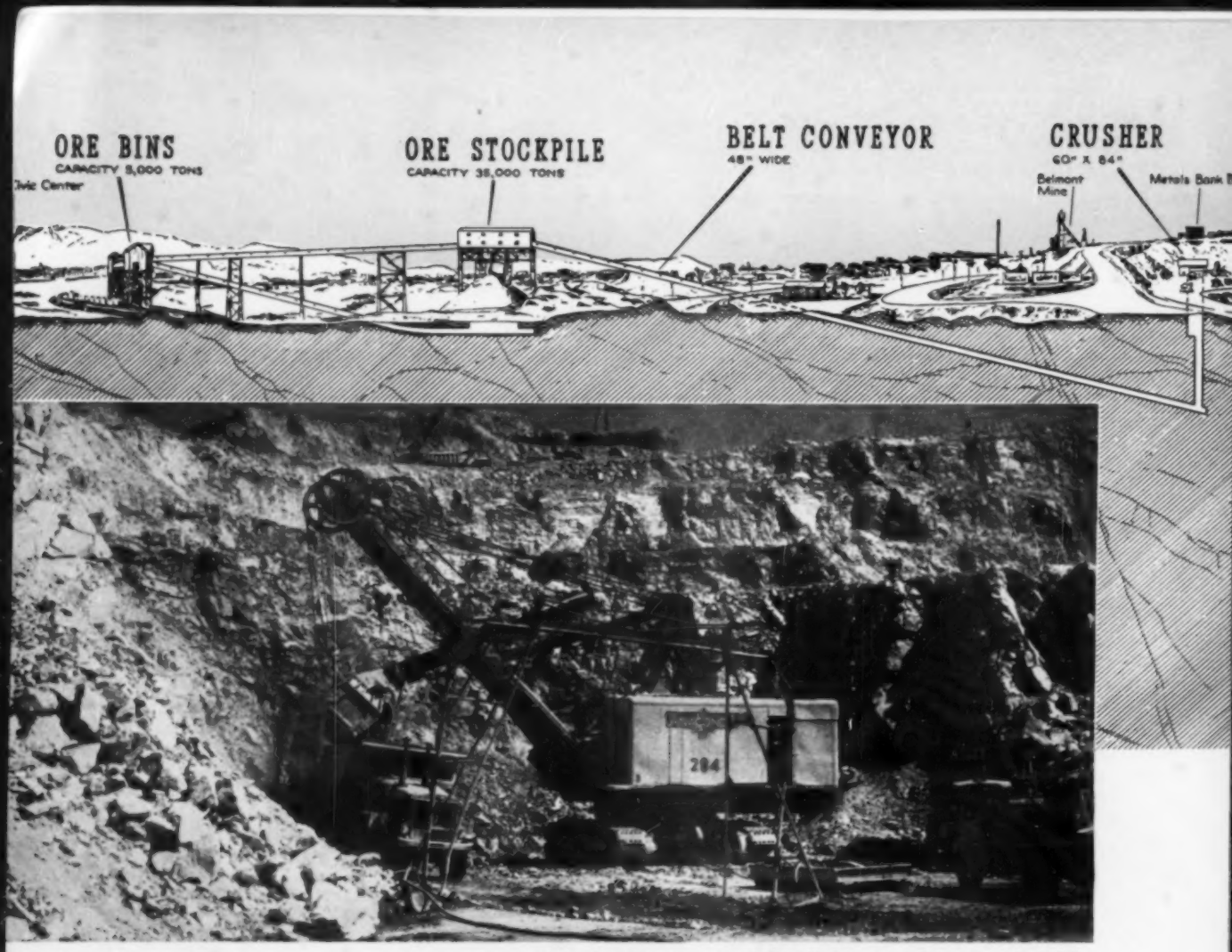
F & S has lowered its powder costs considerably with admixtures of ammonium nitrate prills. Practically every ammonium-nitrate manufacturer has been represented here at some time or another and studies are constantly under way to check each new type of admixture as it's introduced. While the Anaconda Co. is using exactly the same drilling method and explosive method farther down in the orebody, Anaconda explodes its shots with Primacord. F & S considers it satisfactory to detonate holes with gelatin-type dynamite and electric blasting caps. This type of shooting, say field officials, is quite efficient for the purpose, and is fast and economical.

For some time now, F & S Contracting Co. has been using four Bucyrus-Erie 150-B shovels, with a fleet of 47 LVS Mack trucks and six Euclid 63TD end-dumps. When this machinery was brought in, the 6-yd. dipper and 36-ton capacity of the trucks was considered the last word in big-size equipment.

That changed fast with the advent of bigger hauling trucks. Not too long ago, for example, LeTourneau-Westinghouse introduced the Haulpak 60, a huge, well-balanced, powerful vehicle capable of hauling 60 to 65 tons of payload per truck. There was a tremendous potential for this truck at the Berkeley Pit, except for one disadvantage. It took seven passes of one of the 6-yd. dippers on a 150-B to load this rolling Gargantua, and any time a good dirt man has to make more than three to four passes to load

AT EDGE of a high bench, a diesel-electric 40-R drill puts down powder holes. (*Below*) A pattern of drill dust cones lies behind the 40-R as the powder crew moves in with a truckload.

NEWEST MACHINE at Anaconda is this 60-ton experimental truck. It was idle when this picture was taken, waiting for a transmission line trolley to be completed for its trips uphill to the dump area.



FAR DOWN in the pit, copper ore is handled by one of Anaconda's 150-B loading shovels. On its machines, Anaconda protects corner wear by using H&L dipper teeth where the most abrasion and shock occur.

his hauler, he searches for a bigger shovel.

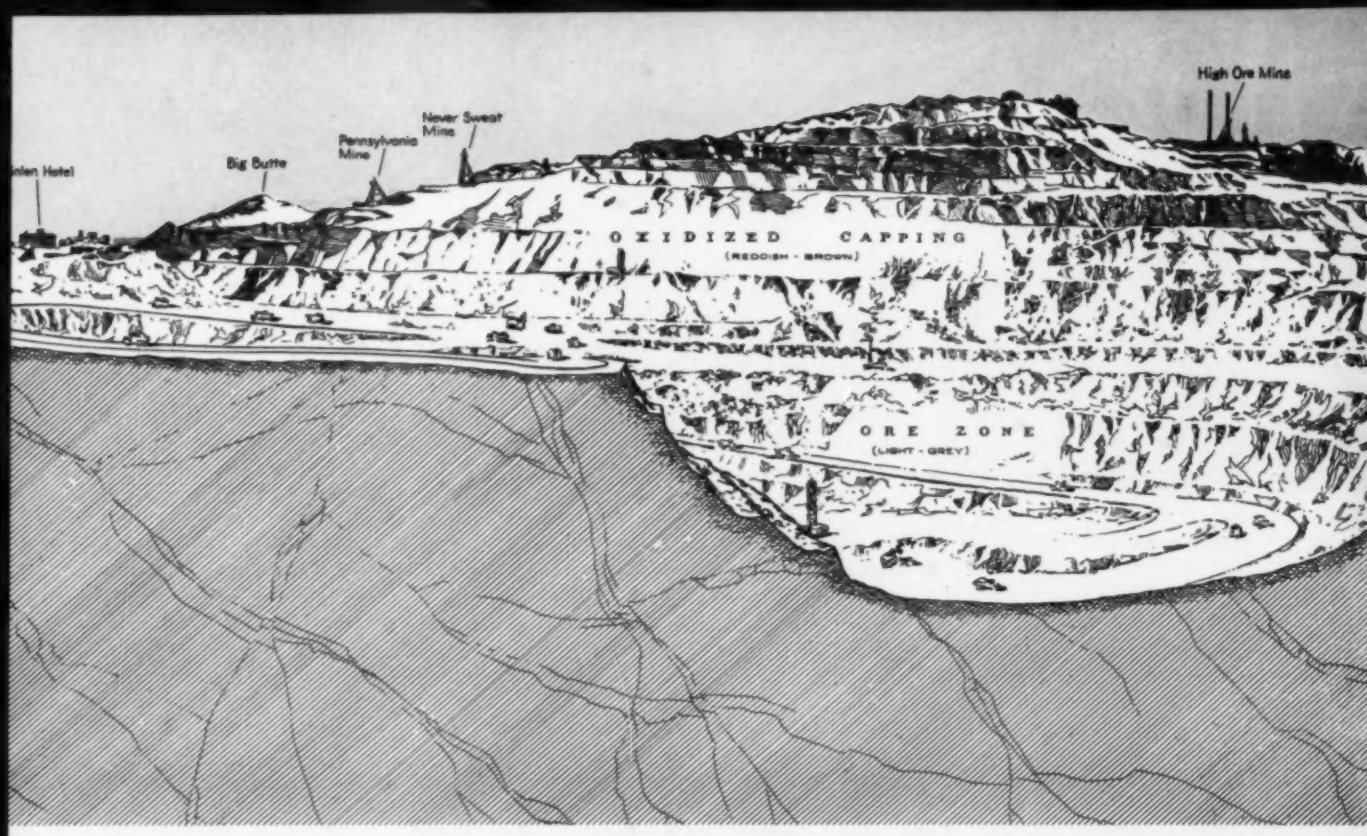
F & S President Les Sheridan decided to do exactly that. After considerable investigation, the company bought a Bucyrus-Erie 270-B, the fourth such shovel in the United States. The 15-yd. dipper ordered for the Berkeley Pit machine, however, is the biggest one placed on the 270-B up to this time. One, working in taconite on the Mesabi Range under somewhat similar loading conditions, has an 11-yd. dipper. Two other 270-B's in the Kentucky coal fields are working as stripping shovels, and have considerably longer booms and sticks.

This one handles its 15-yd. dipper on the end of a 29-ft. stick and carries a 45½-ft. boom. The shovel is all electric, with main power delivered by cable from transmission lines. On the shovel, the MG set delivers 600 hp. The hoist motor is a 375-hp unit. The two swing motors are 62.5-hp each. A change of about 8° was made in the digging angle of the bucket to get a sharper tooth bite into the bank. Following that changeover, digging characteristics have been excellent, and the average production for this machine in the Berkeley Pit overburden is 2,060 tons per hour. The machine will easily bail between 16,500 and 20,000 tons a shift.

Three swings with the big shovel fill one of the LW Haulpak 60's. The bed on this big hauler is arranged with a tapered dip, so that the heavy part of the load is in the center of the machine directly behind the cab. That also increases stability by lowering the center of gravity. A 550-hp Cummins diesel powers this big unit through an Allison Torqmatic drive. Heavy-duty Firestone and General tires are a 21:00 x 25 size. All told, 16 of the Haulpak 60's have been ordered, and when *Excavating Engineer* visited Butte, 12 had been delivered. The first units had worked approximately 1,700 hours and no serious difficulties had shown up.

Simplified Lubrication

An interesting maintenance consideration between the big Haulpaks and the other trucks is that lubrication has been very greatly simplified on the bigger vehicles. When one of the older style trucks passes through the grease rack for a lube job, it's necessary for the grease man to hit 117 fittings. And because there's a constant pounding and breakage of grease fittings, about five fittings per lubrication will have to be changed. The big Haulpaks, on the other hand, have only five lubrication points. It takes far less time and



▲ Reddish-brown material is worthless waste and averages 250 feet thick. Gray material beneath the waste is ore and averages 200 feet thick. Benches are 33 feet high. Waste is hauled in trucks to spoil areas beyond the pit. The ore is hauled by Anaconda's *Butte, Anaconda & Pacific Railroad* to the smelter at Anaconda, 25 miles west of Butte.

DEEP PIT at Butte is named for the Berkeley mine, once a famous lode-mining producer in the Meaderville area.

is a lot simpler to lubricate these big vehicles.

Waste material from the stripping is being hauled to an enormous dump which eventually will completely fill a canyon, cover several ridges and extend well over an unproductive mining area. At the present time the dump has several dumping horizons so that trucks stripping at the top will have a slightly downhill haul, trucks in the center of the overburden won't have too high a grade, and bottom-level strippers can dump at a point economically feasible for them. The dump ground reflects much sound cost planning.

In handling the removal of the orebody, the Anaconda Company is using quite similar drilling and loading methods to that already described. The company has three Bucyrus-Erie 40-R drills and a Joy 225. It hasn't

Why "The richest hill on earth"?

WHY is the Butte mining district called "the richest hill on earth"?

There's good reason. The Butte mines have produced more nonferrous metals than any other district in the world. They continue to supply a substantial percentage of the copper mined in the United States, together with an important supply of zinc. From 1880–1960, men have excavated 41.03 miles of vertical shafts, and 2,577 miles of other passageways. Adding the excavation from stopes, brings the total length to 9,889 miles, more than three times the airline miles from the Atlantic to Pacific coasts.

In cold figures, there's another reason why it's the richest hill on earth. In that same 81-year period, the following amounts of precious metals have been produced:

Copper	15,109,415,640	pounds
Zinc	4,576,775,738	"
Manganese	3,615,634,735	"
Lead	796,554,707	"
Silver	622,002,207	ounces
Gold	2,339,626	"

JOHN KILLOY (*left*), Berkeley pit superintendent, discusses the mining pattern with day-shift pit boss, Emmett Murphy.

gone beyond 6-yd. dippers on its shovels, but it does have four Bucyrus-Erie 150-B's and a 3-yd. 71-B working on ore removal. Its hauling fleet consists of 53 units—29 Mack LRVSW's and 24 Euclid 4FFD's. Supporting equipment includes various tractors, motor graders for haul road maintenance, two water trucks, a powder truck and a fuel truck.

The broken ore is hauled by the trucks to a crusher house where a huge 60 x 84 jaw-crusher, preceded by an 8-in. grizzly screen, pulverizes the material. Going into the jaw, the material first passes across the shaking grizzly, so that acceptable fines under 10 inches are drawn out before they move into the crusher. The crusher discharge combines with minus 8-in. material from the screen as it drops into an ore pass 80 feet deep. The ore then passes out to railroad storage by means of a conveyor belt.

The big crusher has posed a couple of interesting problems. For one thing, the tremendous amount of work it does generates a lot of heat. Coolant is circulated constantly through the big crusher jaw and built-up heat is carried away. The crusher also generates a lot of dust. In order to keep this dust from polluting the air, Anaconda has installed a complete blower collection system throughout the crushing and conveying system. The dust is recovered, and then fed back by short conveyor run to the belt leading to the rail loading point.

Butte today is unique among mining districts of the world in that three methods of mining—vein mining, block caving and open-pit—are carried on here simultaneously.

No story about copper would be complete without relating a little of the early history of Butte. Mining started here in 1864, when into the surrounding hills men came flocking by the thousands from the fast depleting placer workings in California. It wasn't copper, but gold and silver that lured those hardy pioneers into an unnamed and untamed territory. Placer gold mining in western Montana continued for only a short time before the pay dirt was exhausted. Then the discovery of rich silver lodes held the miners' interest in the district. The Anaconda claim was located in 1875.

Copper Discovered

In 1882, when Marcus Daly was mining silver ore from the Anaconda vein, a crosscut on the 300-ft. level exposed five feet of glance. This discovery may be said to mark the beginning of copper mining in Butte.

The orebodies in Butte, from which copper, zinc, manganese, silver and gold are produced by means of underground vein mining, are some of the richest mineral areas ever known. To date Butte hill has produced more nonferrous metals than any other district in the world. It continues to supply a substantial portion of the copper mined in the United States. In all, it has produced more than $3 billion in mineral wealth.

Mining in the Butte area until 1952 was by means of conventional type stoping. The type of stope used depended on the type of vein being mined, the hardness of the ore and the condition of the country rock surrounding the vein. There are numerous veins running great lengths through Butte hill. Many of the larger veins extend to great depths, often more than 5,000 feet with very good values. The production from these high-grade vein mines has contributed the greatest part of Butte's mineral wealth.

In addition to this, an untapped treasure lay under Butte hill—a vast quantity of ore which was too low in copper content to be mined by the underground method historically employed in the area. This ore occurs in small veins or veinlets too narrow to mine; in horsetail formations; in odd shapes where the filling contains copper; and in disseminations of sulphide in the granite between the veins.

In 1947, Anaconda inaugurated an extensive program for the mining of this low-grade material. This operation developed as the Greater Butte project, eventually became the Kelley Mine. It involves the adaptation of block caving, a low-cost method of mining already in use by the company on other properties.

The Greater Butte project contains about 130 million tons of ore, yielding about 14 pounds of recoverable copper per ton plus substantial amounts of gold and silver. Copper from this operation is supplemented by ores from higher-grade veins. Production from this project started early in 1952.

And then, of course, expanded mine production in Butte is evident in other directions, as we have just seen in the detailing of Berkeley Pit, where open-pit mining now supplements underground mine production. The ore mined at Berkeley Pit is primarily sulphide ore with some secondary enrichment. The deposit is relatively shallow, occurring below an overburden of 250 feet of leached capping. Approximately two tons of waste must be removed for every ton of ore recovered. The Berkeley Pit started copper ore production late in 1955 with initial target production of 17,000 tons of ore per day by mid-1957. In 1958, the operating rate had been stepped up to 28,500 tons, and on peak days had gone even higher.

Recent diamond and churn drilling and other geological work in the Butte district will help greatly in the development of plans for large-scale mining and greatly prolong the life of the district.

When it leaves the Berkeley open pit, the Kelley block caving mine, or the deep veins beneath the surface, the copper-bearing ore passes through a similar process. As received by the reduction works, it ranges in size from fine particles to chunks of 10 inches. This ore is first crushed and ground in a series of operations until it resembles fine sand, after which most of the waste material is separated from the copper bearing material by flotation. During the grinding process,

the ore is mixed with water. Agitation and aeration of the finely ground ore pulp is then carried out in flotation cells in the presence of certain reagents which produce bubbles with an oil film, to which the sulphide mineral particles adhere. These bubbles, heavily coated with mineral, rise to the surface and are skimmed off, thickened and filtered. The result is a concentrate containing about 26% copper.

This concentrate is roasted in multiple hearth furnaces to remove a portion of the sulphur content. An interesting point in this roasting operation is that once the sulphur ignites, the heat developed by the burning of the sulphur in the concentrate is sufficient to maintain a continuous self-roasting operation without the use of additional fuel.

The roasted product, "calcine," is smelted in reverberatory furnaces at temperatures of from 2,500 to 2,700° F. In its fused state, the copper combines with sulphur to form copper sulphide. The remaining sulphur in the charge is united with a portion of the iron content to form iron sulphide. The product of this smelting operation is a combination of copper sulphide and iron sulphide called "matte." Part of the iron and all of the silica, alumina and lime in the calcine combine to form slag which is granulated and sluiced to waste.

Pour Off Slag

A converting process is the last stage in the elimination that finally leaves metallic copper. Molten matte from the reverberatory furnaces is poured into the converters, 100 tons to a charge, together with siliceous ore. Air under pressure is blown through the liquid matte, burning the sulphur and oxidizing the iron. Sulphur gas passes out the flue, and the iron oxide combines with silicate to form slag which is poured off—metallic copper settling to the bottom of the converters. This is known as blister copper. It contains some gold and silver plus small amounts of certain impurities which are removed in the refining furnaces. The copper, over 99% pure, is cast into anodes and sent to the company's electrolytic refining plant at Great Falls for further

Continued on next page.

Deeper, but not wider

COMPETITIVE feeling exists between underground and open-pit miners. Each takes full credit for his accomplishments. To underground men, the Johnny-come-lately open-pit miners aren't miners at all, but a bunch of road builders. Open-pit men can't understand how anybody but a mole would enjoy working underground. And they like to point out that a truck-load of ore, loaded in less than a minute, equals hours of advance in a 7 x 9-ft. underground drift. The argument is endless.

The picture above shows a winning skirmish in that battle—this time by underground men. Commemorating an historic event in Butte mining, the picture was taken at the bottom of Mountain Con shaft on July 12, 1961. For years, Butte has been referred to as the city "a mile high and a mile deep." The slogan became an actuality on that date, when Mountain Con reached a depth of 5,280 feet—one full mile. A few more feet have been added since, and now the shaft collar at ground surface is at elevation 6,135, while the bottom of the mine is 843 feet above sea level.

Sinking the shaft to that depth is part of the Anaconda Company's large-scale plan for mining of copper ore at deeper levels. Millions of dollars are being spent to deepen major mines, drive large underground haulage ways and provide extensive ventilation and air-conditioning for mining far beneath the surface of Butte.

The heart of the project is the Kelley mine, where the No. 1 shaft is now being deepened by 2,084 feet, down to the 4,600 level. Ore from deep levels of other mines will be trammed to the Kelley to be hoisted to the surface and started on its way to become wire, bus bars and other useful copper products. The Steward Mine also is going deeper. Plans call for an extension to the Steward shaft to carry it down below the 4,800-ft. level.

The deep-level program is the largest underground mining development in Butte since the start of the greater Butte project (Kelley Mine) in 1947. Approximately five years of work and the expenditure of large sums of money are required to pay for production which is due to start by 1964.

The program, while it probably won't overshadow as a tourist attraction the large-scale Berkeley open pit, will at least open another chapter in the colorful saga of Butte mining. It's designed to tap high-grade ore in areas not previously touched, and to extend the life of the mines. The miners in the picture above have helped to prolong the life of the richest hill on earth, at least to the end of this century and probably beyond.

purification and the recovery of gold and silver.

In the electrolytic refining process, the anodes, weighing 240 pounds each, are suspended in lead-lined tanks, filled with a solution of copper sulphate and sulphuric acid. Thin sheets of pure copper, called cathodes, are suspended in the tanks between anodes. The anodes are connected to the positive terminal and the copper sheets or cathodes are connected to the negative terminal of an electric circuit. Direct electric current flowing from the anodes through the solution to the cathodes transfer pure copper from the anode to the cathode leaving impurities behind as a sludge which settles to the bottom of the tanks. This sludge is recovered, and treated to recover silver and gold and other impurities contained in the anodes. The cathode sheets build up to about 175 pounds in weight and they're 99.9% pure copper.

Removed from the tanks, the sheets are washed and melted in furnaces holding from 500,000 to 600,000 pounds of copper. After melting and proper conditioning, the molten copper is cast into molds for the production of the various shapes in which copper is shipped to fabricating plants all over the nation.

Field operations herein described are under the general supervision of the Anaconda Company's Butte management. E. I. Renouard, vice president, exercises general supervision over the company's and contractors' work. His assistants include Martin K. Hannifan, manager of mines; Edward O. Bonner, superintendent of mines; and George Parker, assistant general superintendent, who has charge of the Berkeley Pit as well as other divisions of the Butte operations. John Killoy is superintendent of the Berkeley Pit.

F & S Contracting Co.'s operations are closely supervised from the home office through President Les Sheridan. Louis Mohr has general charge of the Butte stripping contract, and direct field operations are under the supervision of Tom Davies, pit superintendent.

MINING HISTORY shows in this picture as a 6-yd. 150-B shovel builds a haul road to the top of Berkeley Pit. Some of the old mining buildings dating back to the 1880's still show in this picture.

Passing of an Era

NOSTALGIA comes in large doses when you consider the passing of the underground-mining era.

For instance, take a jeep ride to the 6,000-ft. level at the top of the richest hill on earth. You see a big 6-yd. shovel, its appetite insatiable, ripping the ground away to start a new bench. Nearby, haunted by the ghosts of Micks, Swedes, Cousin Jacks, Finlanders and other members of that colorful lot of bygone days, are the old concrete foundations of shaft houses and reduction plants. Two outhouses, like decrepit derelicts, still perch on a ridge, left behind in the march of progress.

Men worked and loved and fought and died in this setting. Two world wars and the Spanish-American war were fought to victory with the aid of metals from Butte's mines.

Methods Advanced

Looking down from the old shaft houses today, you can watch a modern power shovel do in two minutes what it took a crew half a shift to accomplish not many years ago. You tell yourself you're proud to be part of the technological advance that has made a thing like a 15-yd. shovel and a 60-ton hauling truck a reality. It's safer. More ore is coming out per man-hour now than ever before. All that technology has done is to trade one type of labor for another. For as miners' jobs are supplanted, they are replaced by jobs in factories making shovels, trucks, drills and the like.

You consider these things and it makes a fine theory. But somewhere something is missing. Men today are just as dedicated and as competent, if not more so, than men were in the 1880's and the early part of this century. The thing that's missing—quite validly it seems—is raw courage, the will of a miner to pit his brains and brawn against the unknown of nature. With open-pit mining, the unknown is gone. You dig it up and see it all, by daylight. And something vital is missing, as a result. It leaves you a little sad.

The right design, the right steel, the right shape make *ESCO* Two Piece Teeth right for every digging condition.

The earth moving industry looks to

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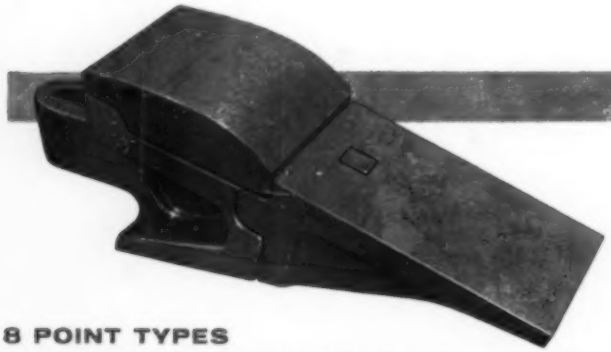
for all your digging equipment

Your *ESCO* dealer can supply two piece teeth for all your equipment. Consult him about standardizing on *ESCO* teeth for the added advantages of quantity purchasing and reduction of on-the-job inventories.



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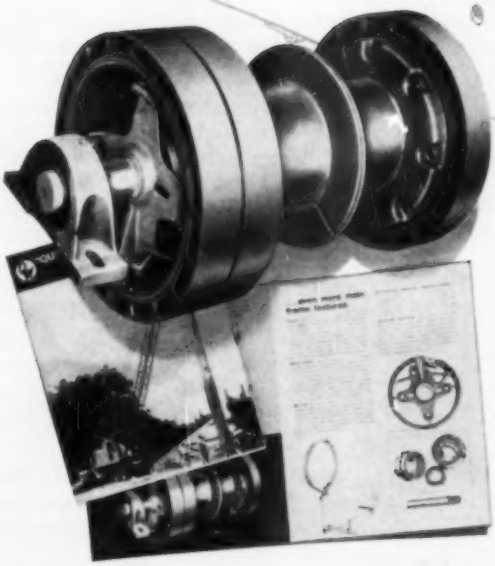

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EFFICIENCY

Is a Measure of Maintenance

How will it reduce down time, cut costs and increase production? This well-thought-out program answers these questions positively.

by Ray Day

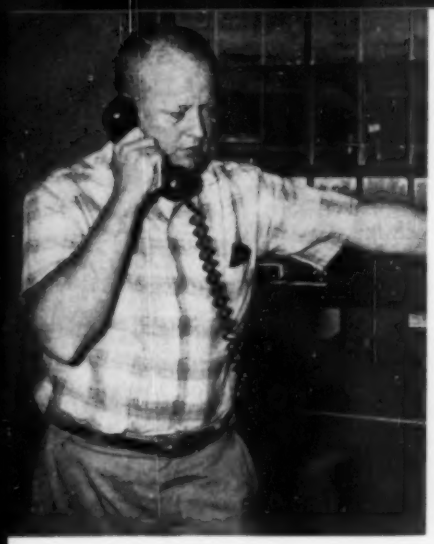
GOOD maintenance, measured in terms of efficiency, is the best investment an equipment user can make. Call it craftsmanship (hiring good mechanics); organization (planning for best use of men and machines); increase in productive capacity; or what you will—good maintenance is simply the same efficiency, repeated in equipment upkeep, which you'd expect to find as the same machines produce in the pit.

That's the thinking at Butte, Mont., where the Anaconda Company has a modern maintenance program in operation. Most of the hauling trucks now have over 20,000 hours on their service cards, but their availability is between 80 and 85%. So it's evident that the program, still relatively new, is working successfully.

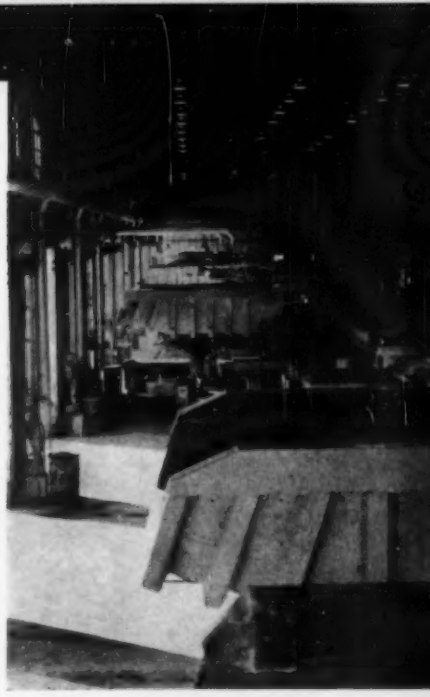
E. M. Peterson, Anaconda automotive superintendent, explained that the program is really simple. It can be costly or less costly, depending almost wholly on efficiency. If equipment service isn't planned for and programmed to head off breakdowns, it's a sure bet that sooner or later the price for lack of planning will be a machine off the production line longer than it should be. And even in the shop, if repairs aren't organized along efficient lines, the program will cost more than it should.

Peterson's men prove regularly that there's plenty of room in a maintenance program for ingenuity. Suppose,

REPAIR SHOPS are enclosed in this 360-ft. building. Big hauling trenches drive into the shop bays.



E. M. PETERSON, automotive superintendent, alternating between his telephone and the shop radio, keeps equipment repair on the move at Anaconda.



LOOKING DOWN from Peterson's office window, the heavy equipment repair shop looked like this to *Excavating Engineer's* camera.

for instance, that a 36-ton truck-bed box is worn to the danger point, and has to be rebuilt. It's often a week's job. But Peterson's men have a truck back on the line in four to five hours. They regularly have Mack double-bogey rear end jobs back on the production line in four hours. Engines? They change one in less than half a shift. Operators often spend $500 for a set of new dozer arms for their big tractors. Anaconda gets the job done for about $107—with a rebuilding program.

Three ingenious parts make the whole of this unique equipment maintenance program. They shape up like this:

1. *DEALING IN COMPONENTS:* By breaking a machine down into such basic components as the power plant, power-transmission train, rear end, torque converter and the like, Anaconda has improved availability two ways. First, it's easier to maintain a card system and keep track of costs on a piece of equipment when repair charges are tagged to the right component. Second, this practice gives valuable information right from the start on what components have weak spots, and how to combat them. An obvious plus, too, is that this system permits more intelligent replacement buying when a piece of equipment is ready to be traded in.

2. *PARTS SALVAGE:* Down one entire fence line near Anaconda's big 360-ft. long shop is a wide row of parts . . . tractor rollers, dozer arms, and the like. Practically all these parts have been rebuilt in the shop as a part of a basic salvage program.

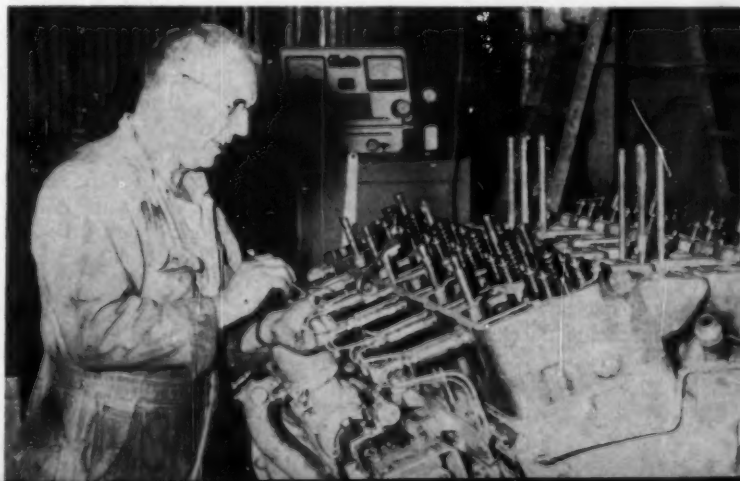
Keeps Crews Busy

In setting up its parts salvage program, Anaconda hasn't made it a competitive thing to new parts replacement. But the company has over 300 pieces of rolling stock to maintain, and it takes a full-time crew of men to do it. Why not get the most out of the crew, the worn-out parts, and time itself by putting things in service again at considerably lower costs than in the investment of new parts? It's just sound business.

Take a set of track rollers, for example. They're good for several rebuild jobs; will last thousands of hours even under tough open-pit mining service. So long as a roller has potential service life, Peterson's crew continues to steam clean, replace bearings and seals, and rebuild the roller drum by automatic welding. It's always a worthwhile spare-time job, and sometimes it's a full-time job.

Two hauling units, a Mack and a Euclid, were salvaged from wrecks to provide a spare box for each. The same operation furnished most of the makings for spare rear-end bogeys now in use. Much can be done along this line by any equipment user, if a real opportunity is made to salvage parts. A spare 220-hp Cummins NH engine and a 450-hp Cummins NVH engine, both salvaged from wrecks,

ENGINE STAND for rebuilds helps to speed the reassembly of this V-type engine. In the background is a Clayton dynamometer, which will run the engine in for a full performance test before it's replaced in a truck.



GREASE is still a mighty important part of preventive maintenance. One of the big hauling trucks at Anaconda's Berkeley pit gets a routine lube here.

were rebuilt with factory parts to new standards.

Engines, incidentally, are replaced as a unit complete with torque converters. Experience has shown that about 6,000 hours under typical Butte mining conditions is about the right spread for engine rebuilding, and that includes torque converters. When a machine needs this service, the engine and converter are simply lifted together out of the unit, and a new replacement—fully rebuilt to factory standards—is put in.

The salvage program hasn't upped the labor payroll unnecessarily, because these men are needed to take care of maintenance on each shift. Also, the reason why new-parts purchases are down can be attributed to this salvage-rebuilding program.

3. *HIGHER SHOP WORKABILITY:* How many times have you seen a master mechanic bite his nails when several mechanics gang up around the parts counter? And have you ever noticed how long it takes, when a mechanic checks out a special tool like an impact wrench, to get the thing to work? Anaconda's program has solved these two time-consuming headaches.

Congestion at the counter has been reduced because mechanics no longer wait for the parts they need. The solution? It's simple. After a mechanic dismantles an equipment component and spreads it over the floor for inspection, he merely presses a red signal button close by. A horn blares. It's the signal for the "parts runner," a man skilled in the nomenclature and numbering of parts for any of Anaconda's rigs. He brings the order form with him, and keeps it visibly clean as he jots down what the mechanic needs. Grease is fine in a fitting, but clean order blanks result in fewer mistakes.

And while the parts runner is away at the parts desk, reducing congestion and speeding the assembly of the necessary parts, the mechanic stays busy at his job. The time it takes to assemble a parts order is usually enough to permit steam and solvent cleaning, further inspection, and other things that always have to be done to ready the equipment for repair and reassembly.

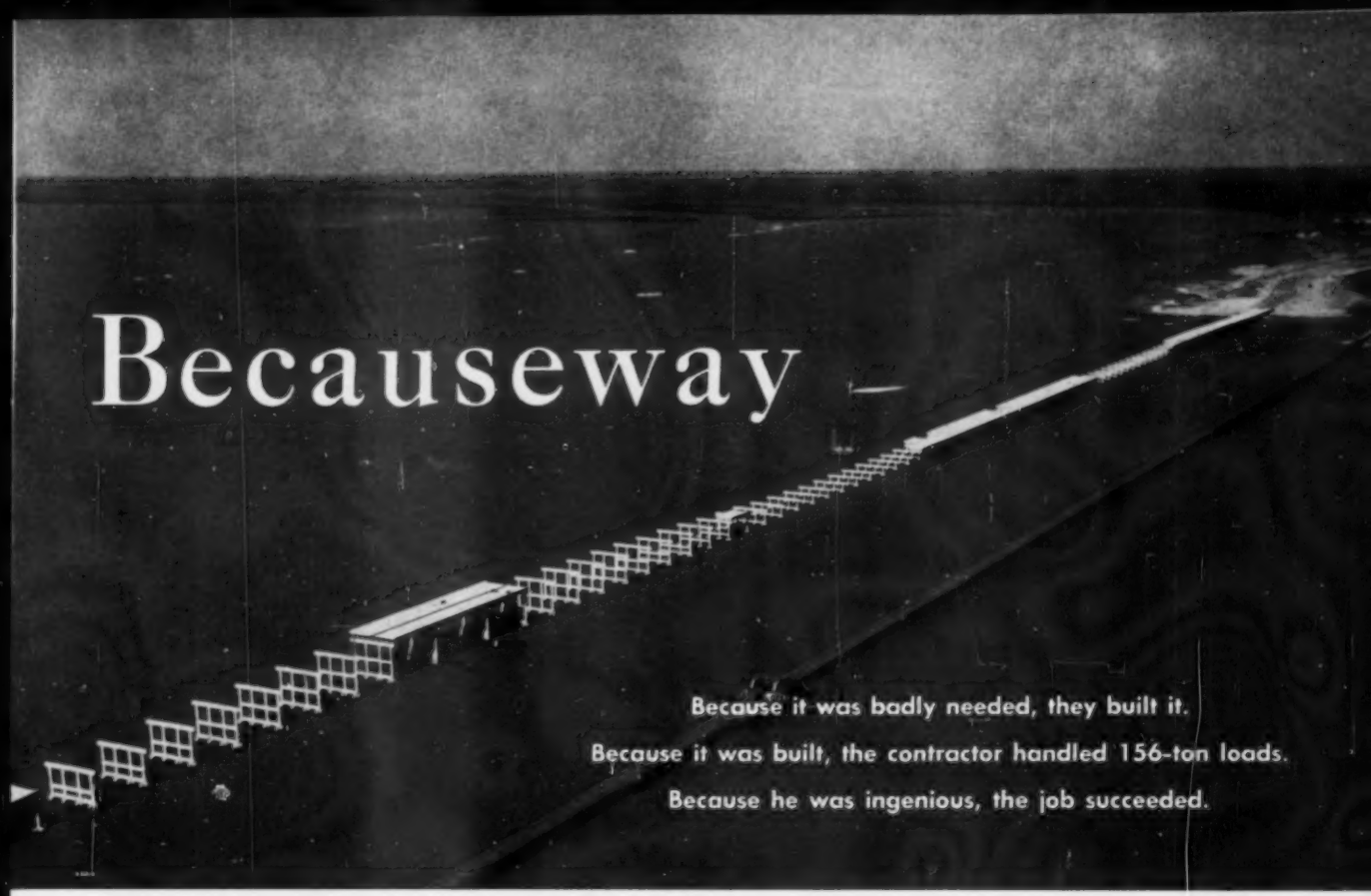
Now, when a mechanic checks out a torque wrench, he doesn't have to work 30 minutes to get the thing to work. Cutting tools are freshly sharpened. The skilled mechanic who handed it over the counter to him had done that, placing it in top-notch service. He'd done the same for other small tools, electric drills and the like. There's so little lost motion in the big Anaconda shop today that a mechanic really works a full eight hours.

Further, to boost the shop's efficiency, it's been divided into specialized divisions. The truck repair bays can take the biggest trucks at Butte. There are other divisions: lubrication, tractor shop, tire repair, welding and boilermaking, engine repair, transmission room, and converter room. The shop has steam cleaning facilities, a paint shop and plenty of 15-ton overhead crane facilities.

In short, Anaconda's equipment maintenance follows the routine largely outlined by the individual manufacturers of that equipment. But by making its mechanical manhours really count, the cost of maintenance in dollars and time has been reduced. The dollar saving is a direct advantage. And the reduction of down time in the shop makes for greater production availability in the pit, reducing costs again by reducing the number of machines it would take if availability wasn't so high.

SPARE PARTS are the rule rather than the exception at Anaconda. Here a welder, in his spare time, works on a 6-yd. Bucyrus-Erie shovel dipper doing preventive hardfacing.

Becauseway



Because it was badly needed, they built it.

Because it was built, the contractor handled 156-ton loads.

Because he was ingenious, the job succeeded.

GLEAMING CONCRETE causeway 2.2 miles long stretches across Lavaca Bay. Practically all structural components were prefabbed. Old causeway is in foreground.

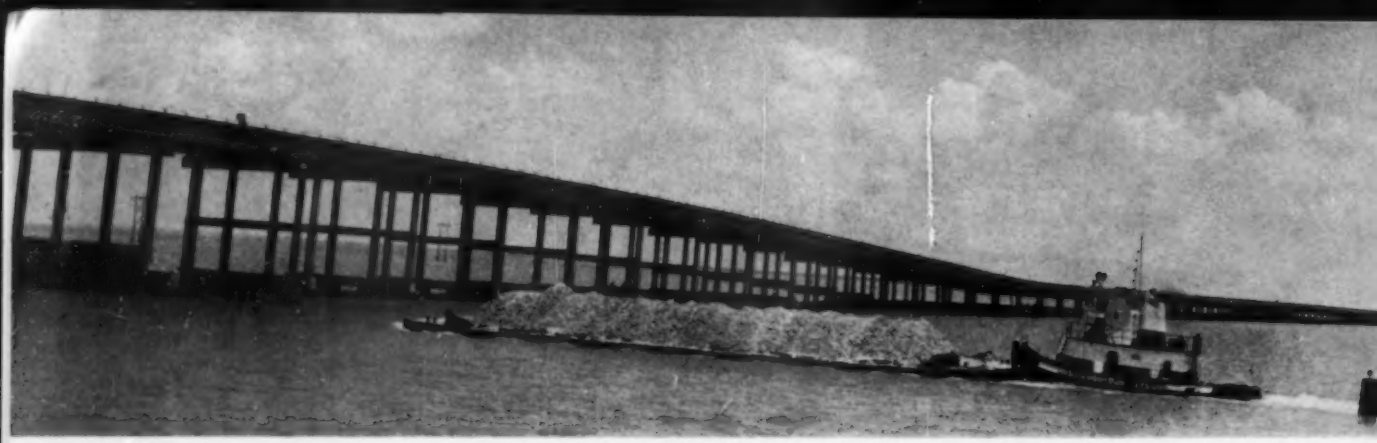
by Floyd Suter Bixby

TO build a bridge best, build it on land if possible. Or build on dry land and then assemble the pieces where the bridge goes. It saves money.

Bridge builders have known this for a long time. It's the way beavers build a dam, and they're mighty efficient engineers. A few years ago, the Missouri river at Liberty, Mo., was bridged the classic way by building the structure entirely in a dusty cornfield. Later, the Corps of Engineers dredged the river channel deeper under the bridge piers. Every part of a bridge for Eureka Slough, Calif., was built in a San Francisco shipyard; carried on ocean-going barges 500 miles north; and then assembled. The main components for the latest San Francisco Bay bridge were prefabbed. So the idea isn't new.

In south Texas, at Port Lavaca, one of the most extensive uses of this practice has been a first in that territory. Lavaca Bay causeway—11,900 feet of velvet smooth concrete across an arm of the Gulf of Mexico—has been created as a result. The project raised the usual problems in marine bridge building. But special machines for handling 156-ton prefabbed deck sections had to be designed by mechanical engineers; then built to specifications. A precasting bed had to be devised, with working room sufficient to handle everything from 60x 32-ft. deck sections to 98-ft. concrete piles. Heavy weights had to be lifted from barges in wind and waves. For Contractor Elmer C. Gardner, Inc., of Houston, it wasn't the easiest job of the year.

It couldn't be the slowest, either. The existing two-lane causeway



HIGHEST POINT in the Causeway is 45 feet from the water, allowing an uninterrupted flow of traffic into the bay. This section of the bridge and the two ends were the only parts poured in place.

was much too narrow, and increasing waterway traffic tied up lines of cars every time the bridge opened. The new structure, built to four-lane standards, carried a tight time clause. It provides greatly increased clearance over the bay. It won't be necessary to open the new causeway for every small boat that comes along, because a special steel-girder navigation span is high enough to clear water traffic.

The Texas state highway department design, planned for modern axle loading, centers around two 26-ft. roadways separated by a 6-ft. dividing median. These, in turn, rest on a substructure foundation.

Carrying the weight of the structure at each bent are ten 20-in. square prestressed concrete piles, 58 to 98 feet long. Each was driven to 60-ton bearing. To add bearing and shear resistance in the bay mud, piles in each bent were battered outward. Each cluster calls for two rows of five piles. Side and end piles were battered opposite to the direction of bearing force in each bent. There are pile bents every 60 feet across the bay.

Directly over each pile bent is a 3-ft. thick reinforced pile cap, or footing. Outer portions of this cap were designed 7x8-ft. in size, while smaller 3½x8-ft. sections were drawn near the bent centers. There, loading would diminish by comparison to the outside.

Topping the pile cap is a 2½-ft. thick concrete tie beam, which carries 30-in. round columns, four to a bent. The cap is 3½ feet deep. In turn, it carries the massive 156-ton deck sections, with girders cast monolithically. The 156-ton weight represents only half a deck slab. Set in place, right and left-hand pieces leave a 1-in. gap in the center of the dividing median. The big pieces are 54 inches thick from the top of the deck slab to the bottom of girders.

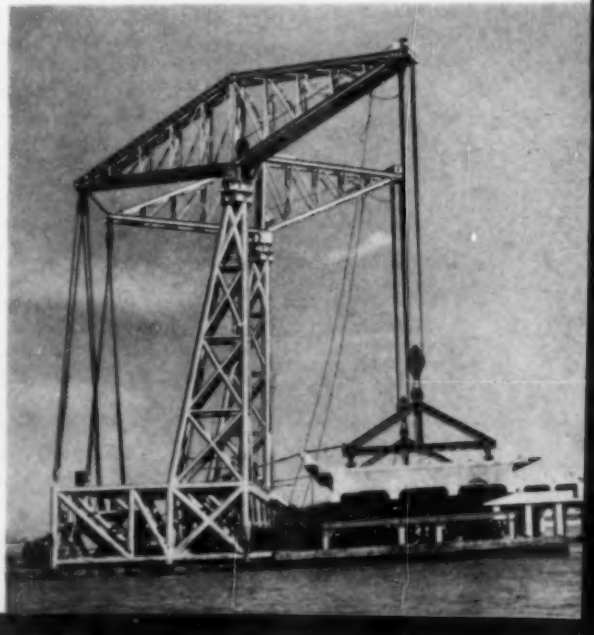
Tendons Stretched

Each girder was prestressed by stretching 28 steel tendons, of 7/16-in. diameter, to 18,900 pounds each. The deck slabs were heavily laced, in addition, with reinforcing steel.

Precasting of concrete piles was the first order of business. Gardner had previously located a suitable yard site on an upper arm of Port Lavaca Bay, north of the city.

Concrete piles were poured in two 500-ft. long beds, making 10 units at a time when 98-footers were being turned out. With 2,000 piles to make, it was a sizeable job. Gardner had arranged for steel pile forms to be manufactured, with hydraulic jacks to prestress the concrete shell. To get maximum strength with optimum weight, 11-in. diameter pipe mandrels were used to shape a void in the center of each pile. After the units were finished, and initial set had occurred, water at 120° temperature was circulated through the void to hasten curing.

When Gardner's crews moved in, bay depth at the causeway site was only 3 to 9 feet deep—not enough at low tide for equipment to float safely. A 150-ft. work channel was dredged



SPECIALLY DESIGNED barge, the *Sea Horse*, has a pair of crane-like arms that hoist causeway decks into place by a series of winches.

as a preliminary, using a small suction machine which also dug mud from some of the approach foundations. This gave enough width and depth to carry Gardner's floating marine equipment comfortably.

Piles were driven from a 40x100-ft. barge, equipped with spuds and anchoring winches. A Bucyrus-Erie 38-B crane was used for a time to jet pilot holes for the square concrete piles, and a hydraulic drill also was used. While the mud and Victoria clay under the bridge wasn't tough material, it was sufficiently stiff to cause considerable trouble in driving the 20-in. square piles. For a time, it was the No. 1 job problem.

The main job of piledriving was handled by a Manitowoc 3900, swinging set of piledriver leads from its 120-ft. crane boom. A No. 22 diesel pile hammer slammed the concrete piles down to 60-ton bearing, or refusal, whichever occurred first. With pre-jetting, it was possible to get full bearing and full penetration.

Tight Schedule

Gardner's project manager, Eugene Horstketter, had set an ambitious schedule of a bent a day for Superintendent Marshall Boehuning and his assistant, Slim Ellison. This schedule governed everything. So during the piledriving phase, crews made every effort to complete at least 10 piles per shift. Sometimes they did even better.

Pile caps were the one item impractical to precast. They had to be made in the field. Thanks to careful planning by Gardner's executive force it wasn't a difficult job.

Gardner geared up for this underwater operation by having several sets of steel cans, or caissons, manufactured by a structural-steel firm. Each can was made 18 feet high, allowing plenty of room to bed down into the bay mud, and for high-tide protection. To start a pile cap, a barge-mounted Bucyrus-Erie 54-B crane set the can in place over the driven pile bent, and bedded it down into the mud.

Several 4-in. Wisconsin-driven centrifugal pumps then took over, and unwatered the area inside the steel cell. When the cell was unwatered, a small sump was dug by hand, and suction hoses placed at the lowest point. Three such pumps lasted the entire project, and according to Slim Ellison, did an outstanding job with little maintenance.

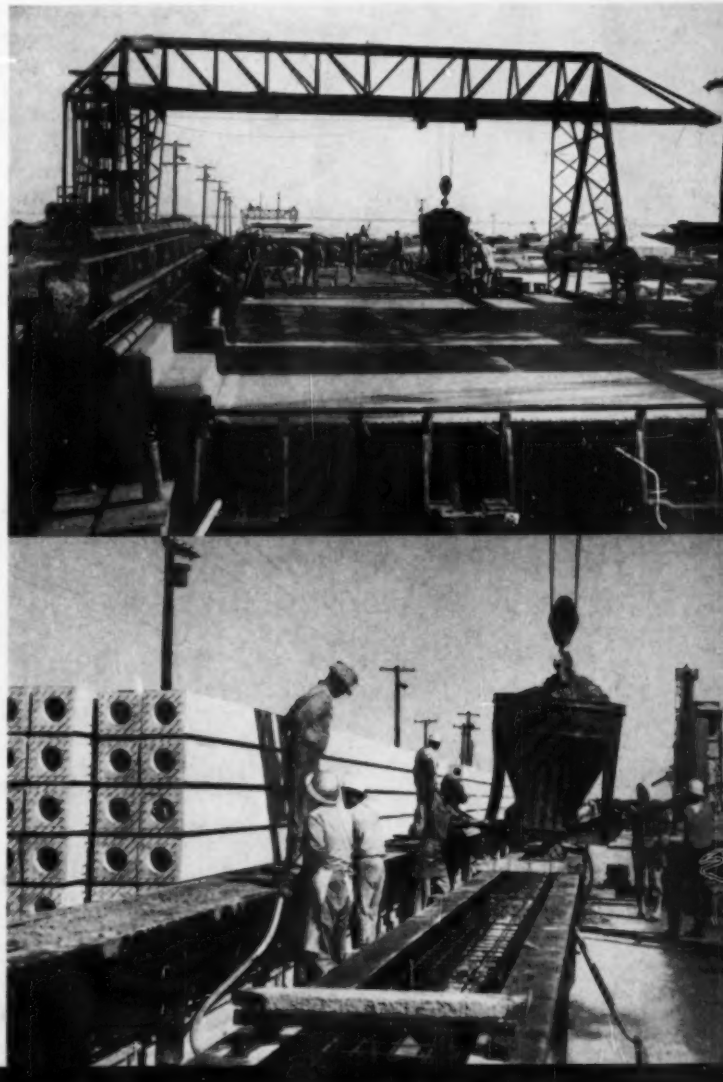
When this preliminary work was finished, carpenters moved in to attach form clamps to the caisson inside. Forms consisted of a wood floor, and metal sides. The floor was made by placing ¾-in. plywood over 2x6-in. stringers.

Field concrete was mixed at the site, using floating equipment. A set of C. S. Johnson sand and aggregate bins, with enough cement storage for 55 cubic yards of concrete, was placed on the barge. A Smith turbine mixer, of ½-yd. capacity, did the concrete mixing. A Northwest 25 crane, handling ½-yd. and 1-yd. clam buckets, kept the bins charged and handled a transfer bucket for placing the fresh concrete. Fresh water also had to be carried on the barge, because bay water was too brackish for concrete mixing.

"We had a tight schedule on these pours," Ellison said. "Often we had to schedule in a hurry; order extra cement above the other precasting needs. But it was a pleasure to do business with Halliburton, in Corpus Christi. They took orders sometimes in the middle of the night—we were running the casting bed around the clock—and they never missed a cement delivery. You don't get that kind of service often."

Tie beams were a precast item,

MASSIVE CASTING in fabrication yard here is a 156-ton deck section. Deck slab is poured monolithically with the pre-stressed bridge girders.



FRESH CONCRETE is dumped into long narrow form to make precast concrete piling. Stacked at the left, completed piles with formed voids are ready for the pile driver.

PILEDRIVING is handled by Manitowoc crane with swinging leads. The machine brings a concrete pile into the leads while the diesel pile hammer is carried low.

weighing eight tons average; 10 tons in the center portion. They were cast in three pieces at the yard, then tied together at the causeway site. Lifting eyes were placed in each block in the yard, and a small yard gantry crane handled these pieces easily. Later, the lifting eyes served a useful purpose when the 54-B crane and a Manitowoc 3000 set them in position in the field.

The 30-in. round columns were also poured in the field. Gardner had a special rack made up, with the four steel column forms properly centered. The entire rack could be set at one time; then lined up and braced with cables and turnbuckles.

About 30 bents, near the end sections, were poured using wooden forms. This was done because tight time scheduling prodded field crews into extra production.

On the low portions of the causeway, where these columns were fairly short, the cap was poured monolithically with the four columns. But in the center part, where clearance above the water was considerably greater, the cap was placed separately, after the columns were cured out. Two sets of metal and one set of wood forms handled these pours.

Biggest prefabbing were the last pieces—the 156-ton deck slabs. With the exception of two end spans and 260 feet between bents 115 and 118, all remaining deck slabs were massive castings, made on shore and hauled to the site for final installation. More time and study went into the design of special machines to handle these pieces than in all the rest of the job. Deck slabs were that heavy and dangerous to handle.

Each piece contained 75 cubic yards of concrete. Since both the right and left-hand halves were made at the same pour, it was a 150-yd. operation. Each half contained its own portion of the dividing median and the parapet wall for that section.

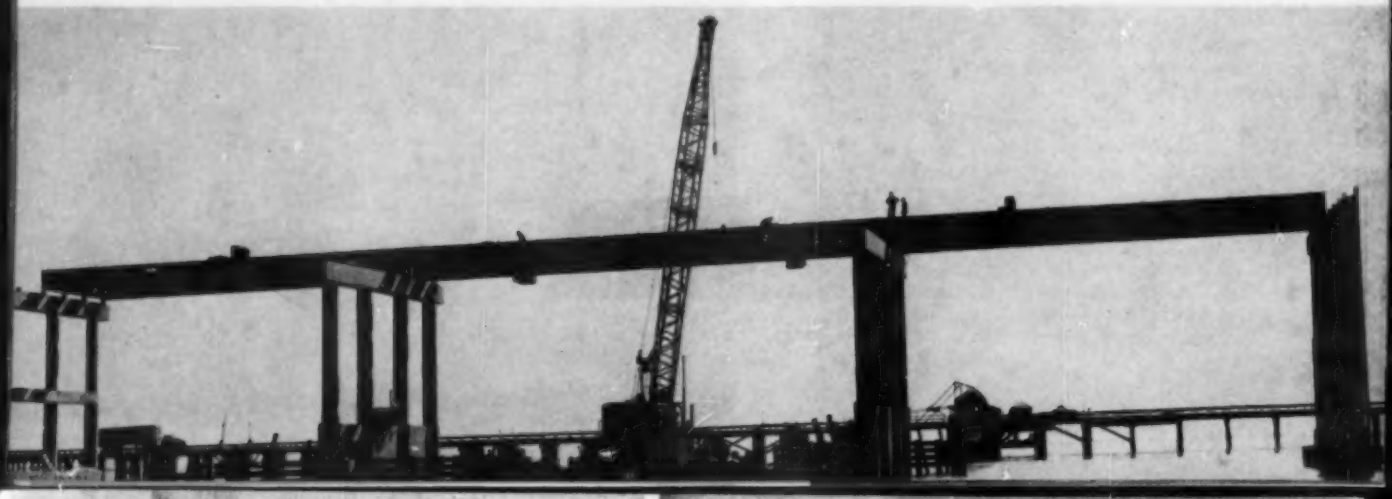
Cured Under Heat

A special dolly with hydraulic rams was devised for the casting bed, so that the heavy pieces could be handled easily on shore. After pouring, the prestressed girders and monolithic reinforced deck slab were cured under heat for 10 to 17 hours. Picked up gently, the slabs were then moved out of the way, and sprinkler cured again 48 hours until the concrete strength reached 5,000 psi. At that point, they were loaded to barges.

At the causeway site, the *Sea Horse* went to work. It was a special heavy-duty derrick, designed chiefly by Gardner's Eugene Horstketter and Jim Harris. It consisted of a basic 30x80-ft. barge, flanked by an extra 10x50-ft. barge on each side to increase flotation strength under heavy lifts. Two moving spuds were controlled by hydraulic motors; two storm spuds were handled in emergencies by crab-type hand winches.

Hoisting equipment consisted of

STEEL SUSPENSION girders for the highest part of the bridge are lifted into place by a barge-mounted 54-B crane.



heavy-duty, deck-mounted drums. All controls and main drives were hydraulic, and 12-part blocks reached down from twin booms to make the heavy lifts. Deck slabs were set by this machine in winds up to 30 mph, with waves to match. The rig was forced out of the bay into shelter during a few bad storms, but for the most part it handled its job with amazingly few bugs. There wasn't a single accident as the heavy sections were set.

The navigation spans between bents 115 and 118 consisted of steel-girder construction, with a concrete deck. These were made in place. So were the two end bents, which joined with land abutments.

Meanwhile, earthwork for the approaches moved at good speed (see box), so that currently, motorists have a speedier, safer journey along the Gulf.

The new causeway was designed and under the general supervision of D. C. Greer, state highway engineer of the Texas state highway department. Randle B. Alexander was bridge engineer. Field engineering personnel included Resident Engineers J. R. Mica and W. A. King at the causeway, Resident Engineer Melvin Rylander at the approaches, and his assistant, LeRoy T. Walther.

Slim Ellison was in direct charge of field operations, and Charles Varsik in charge of the yard, reporting to Superintendent Marshall Boehuning and Project Manager Eugene Horstketter.

There's Dirt Work Too

BRIDGES don't get public acceptance unless the approach fills are properly made . . . and in this case almost every soil trick south Texas highway engineers ever learned had to be used. First, nearly a million yards was dredged by three small suction dredges owned by T. L. James Co. That got rid of the soft muck and bay mud near the surface, and opened up the harder Victoria clay underneath for good bearing.

South Texas Construction Co., of Corpus Christi, has now moved in with earthmoving and processing equipment to do another tough job—break down 40-PI clay, in black, sticky chunks, to a friable fine 10-PI material. It was done by using 4% of lime slurry by weight, waiting three days for the lime to react on the clay, and then blending the materials with an American-Marietta "Deep Mix Special" rotary mixer.

Built especially for deep mixing in heavy soils in one pass, this machine has successfully worked 16 inches deep in heavy Texas clays. Here, where the mixing depth was only eight inches, it handled the operation with power to spare. The machine has literally made highways possible in many "impossible" places where the only soils are heavy clays.

There's some 98-ft. shoulder-to-shoulder work to make four-lane construction near the causeway ends. Some are narrower, to make the transition to a two-lane highway. In all cases, however, construction was the same. It called for eight inches of lime-stabilized subgrade, 11 inches of sand-shell-caliche base, blended and mixed by the Deep Mix Special, and a double penetration asphalt surface. Stiffening the base to a total depth of 19 inches is expected to carry future traffic without difficulty.

Under Field Superintendent Eddie Hood, this work has moved fast. Grading was handled by a pair of Cat DW20's, an 8-yd. scraper, five D8's for pushing and dozing, and four motor graders. On the lime stabilization operation, the American-Marietta mixer teamed with lime trucks, two 50-ton Tampo rollers, and an International-drawn Bmco pneumatic. Chevrolet 60 trucks, with Hobbs-Schonrock cable-controlled trailers, hauled in the sand-shell-caliche mixture for base-course topping.

The reduction of black organic clay to good roadbuilding material, through lime mixing, never ceases to amaze even the engineers and contractors who have to work with the stuff. Here, chunks of black, viscous clay tough as leather were reduced to a minus-40 product, friable and easy working.

AMERICAN-MARIETTA deep-mixing Pulvi-Mixer did the job of blending soil and lime to upgrade bearing value on the bridge approach fills.

LIQUID LIME slurry, containing about 30% solids, goes on the clay surface as a sprinkler truck does its work. The lime will break down the sticky clay; give it higher bearing value.

SEVEN SLABS on the new causeway were displaced from three to six feet during the storm. The two north lanes on the causeway were open to traffic the day after the storm.

HUGE 150-TON slabs on the new Lavaca Bay causeway were picked up and tossed around by the high tides of Hurricane Carla. Only slabs near each end were damaged and only those on the south side nearest the Gulf.

Causeway Withstands Wrath of Hurricane Carla

HURRICANE Carla struck the Texas coast at Port Lavaca on September 11, 1961, registering winds in excess of 150 mph. The storm drove before it a half million people in the greatest mass exodus from a natural disaster in the history of the United States.

Despite the intensity of the storm, which was the worst in Texas since the 1930's, the new concrete Lavaca Bay causeway sustained relatively light damage—a tribute to its design and construction.

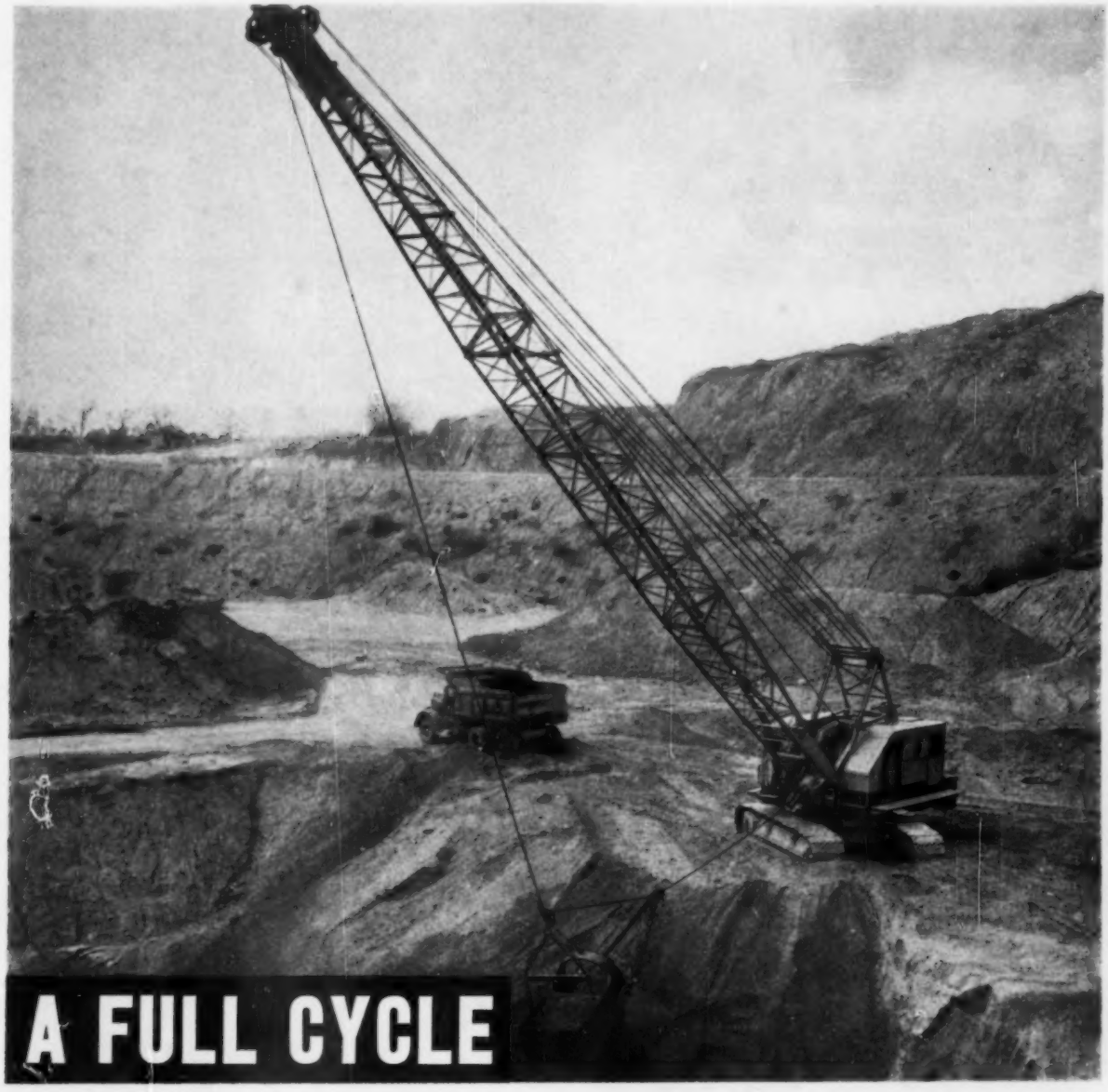
Seven of the 150-ton precast slabs were torn from their mountings, picked up and tossed three to six feet. Some of the slabs were jammed against those bolted on the north side and broke off large pieces, exposing the reinforcing steel. Fortunately, all the damage was to the south-side slabs, so that traffic could proceed on the two north lanes by the morning after the storm.

Estimate Repair Cost

Repairs will cost approximately $117,000, according to Texas state highway department estimates. The brand-new $5 million causeway was formally dedicated last summer.

A half-mile of flexible base paving on the east-end approach to the bridge was laid at that time to allow traffic onto the structure. Approaches had been expected to be fully completed in October and the new causeway opened permanently, but now the final opening will be delayed for several months.

The hopes for Texas to have one of the longest fishing piers in the world may be gone. The old wooden Lavaca Bay causeway, which was to be made into a fishing pier, was virtually wiped out. Only a few small sections were left standing. The old bascule drawbridge in the middle was also torn out and swept away.



A FULL CYCLE

FASTER, MORE OFTEN WITH AN 805

The ability to dig in and get out *fast*, with a profitable payload on every cycle, has made the 805 a favorite in gravel pits everywhere. It's quick to respond under all digging conditions. With 2 or 3 yard bucket, 50 to 150 feet of boom you get the capacity and range needed to move more tons per shift.

A power assist on big main drum clutches provides finger-tip control, yet gives the operator positive feel of the load. Engaging speed is automatically controlled to cushion shock and impact loading, protect cable.

Revolving fairlead turns 360° — maintains true cable lead at every pull angle on bucket. Only two sheaves — large diameter — prevents sharp reverse cable bending, provides longer cable life.

See your distributor or write for bulletin!

KOEHRING MEANS HEAVY-DUTY

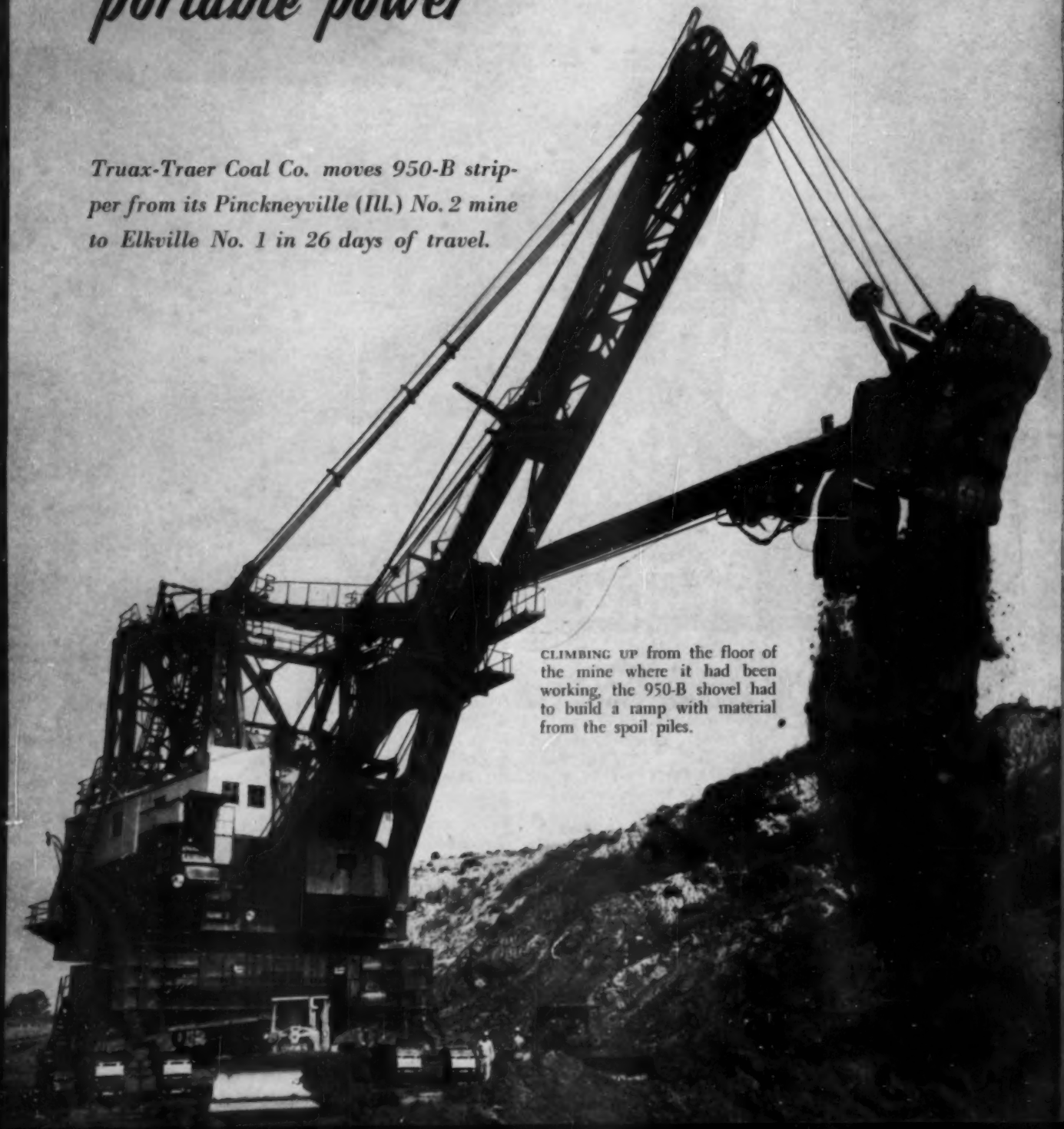
KOEHRING
DIVISION OF KOEHRING COMPANY
Milwaukee 16, Wisconsin

K111

1,000-TON Shovel

moves 12 miles with portable power

Truax-Traer Coal Co. moves 950-B stripper from its Pinckneyville (Ill.) No. 2 mine to Elkville No. 1 in 26 days of travel.



CLIMBING UP from the floor of the mine where it had been working, the 950-B shovel had to build a ramp with material from the spoil piles.

TRAILER MOUNTING for the electric generator sets permitted them to be hauled over the highway from Peoria, Ill., to Pinckneyville. At the mine, they were attached to specially-built dollies that permitted them to be towed by Caterpillar D8 and D9 tractors during the move.

WHEN the construction of a temporary high line proved uneconomical, portable power stepped in to solve the problem of moving a 1,000-ton stripping shovel from one southern Illinois coal mine to another. A package unit of two electric sets, capable of generating up to 1,500 KVA, provided power for the 12-mile cross-country trip. The Bucyrus-Erie 950-B shovel was moved from the Truax-Traer Coal Co. mine No. 2 at Pinckneyville to its No. 1 mine at Elkville in 26 days.

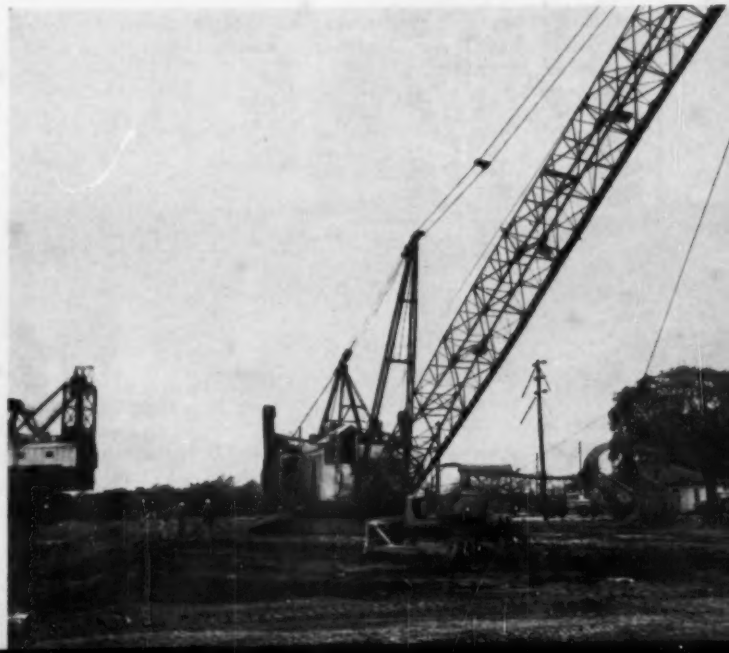
Work went on around the clock with three crews of six men each taking eight hour shifts. Power was supplied by two Caterpillar D398 trailer-mounted electric sets. The electric sets were rented to the coal company by Peoria Tractor and Equipment Co., Caterpillar dealer in central Illinois. They are the first portable units to be built with Caterpillar's new V-12 diesel engine.

The big shovel swings a 30-yd. dipper on a 72-ft. dipper handle. Boom length is 105 feet. The move was the first time Truax-Traer has deadheaded a machine of this size on portable power.

R. E. Henderson, the mining firm's division manager for southern Illinois, said he was well satisfied with this method of deadheading the shovel. "We will probably consider portable power if and when we have another stripping shovel to move through areas where existing power lines are not available," Henderson said.

During the move the shovel had to be taken across the Illinois Central Railroad main line and spur tracks, numerous telephone and telegraph lines, state highway 152, several secondary roads, two 33,000-volt power lines, one 69,000-volt power line and three 12,000-volt power lines. The entire move was made on wooden mats, each made up of eight 16-ft. lengths of 12x12 lumber. The shovel placed the mats in front of itself.

For railroad and highway crossings, six feet of dirt was first piled on the right-of-way. The mats then were laid and the shovel crawled across. In crossing electrical power lines, Illinois



COMPANY for the big shovel on its 12-mile trip was a Page model 629 walking dragline. It helped with the highway and railroad crossings by piling dirt on the right-of-way.

MAIN HIGHWAY crossing was Illinois route 152, just west of DuQuoin. Here the big shovel swings a "mat" to be placed in front of itself. Six feet of dirt piled on the roadway protected it from the machine.

Power Co. crews installed temporary lines around the move area. In this way the company avoided a power interruption when the main lines were cut. Two hundred foot sections of telephone and telegraph lines were run through cables and buried to allow the shovel to pass over them.

Standard No. 1-0 mine cable was used to transfer power from the trailers to the shovel. A 1,000-ft. cable plus a 600-ft. extension enabled the shovel to move 1,600 feet beyond the trailers before it was necessary to move them. By placing them 1,600 feet in front of the shovel, Truax-Traer crews were able to move the shovel 3,200 feet before repositioning the power sources.

When the shovel was digging its way out of the No. 2 mine, both electric sets were connected in parallel to provide maximum power. During most of the move, however, only one set was needed. Two Cat D8 tractors, one D7 and one No. 12 motor grader accompanied the shovel, piling dirt for highway and railroad crossings and leap-frogging the electric sets.

Lengthy Planning

Planning for the move began more than two years ago. Truax-Traer considered setting up temporary power lines for one-time use along the route. This method was rejected in favor of the more economical portable power method. To lay out the best route for the move, the coal company had aerial photographs of the entire area taken and assembled them into an aerial map.

Switch gear for the electric sets was provided by Republic Electric and Development Co., Washington, Ill.

C. D. Heatherly is division superintendent for Truax-Traer's southern Illinois operation. Howard Clark is superintendent of mine No. 2; Ralph Tolliver superintendent of mine No. 1.

TIMBER MATS provide solid footing for the big crawler units at each corner of the shovel. Eight 16-ft. lengths of 12 x 12 lumber were joined for each mat.

NOT IN THE CONTRACT

An invitation to dinner had been sent to the newly settled physician. In reply, the hostess received an absolutely illegible letter.

"I must know if he accepts or refuses," said the wife.

"If I were you," suggested the husband, "I would take it to a druggist. They can always read a doctor's handwriting."

The druggist looked at the slip of paper, went into his dispensary and returned in a few minutes with a bottle.

"There you are, Madam," he said. "That will be $7.50."

"Will you really marry me?" the trembling youth exclaimed, as if unable to realize his good fortune. Then —"When we're married, darling, the dark clouds will roll away and the blue sky . . .

"Just put the ring on my finger," suggested the girl, "and forget about the weather report."

Marcella: "You've been secretary to almost every vice president in the office."

Beverly: "Yes, I'm just about on my last lap now."

A fellow who had had one too many was driving the wrong way on a one-way street and was hailed by a cop who rasped, "Hey, didn't you see the arrows?"

"Honest, offisher," gurgled the driver, "I didn't even see the Indians!"

Cute stenographer: "Your wife wants a kiss over the phone, Sir."

Boss: "Take the message. I'll get it from you later."

Small Bobby had been to a birthday party, and knowing his weakness, his mother looked him straight in the eye and said, "I hope you didn't ask for a second piece of cake?"

"No," replied Bobby, "I only asked Mrs. Smith for the recipe so you could make some like it. She gave me two more pieces."

"Could I try on that red dress in the window?" asked the pretty young thing.

"There's no need to do that," the elderly saleslady answered coldly. "We have several fitting rooms."

Some folks have been so scared by reading about the harmful effects of smoking that they have decided to give up reading.

The tea party was going full swing. One old biddie remarked to another, "You say your daughter didn't get home from the party until 2:30 this morning. Why, my daughter was home before midnight!"

"Yes," the mother said, "but my daughter walked home."

"Hello, operator, I would like to call the Reverend Smith in New York. This is the Reverend Turner calling."

"Is this a station-to-station call?"

"Don't be foolish, young lady, this is a parson-to-parson call."

One cave-man to another: "Don't tell me there's no connection. We never used to have weather like this before they used bows and arrows."

"The man who marries my daughter will get a prize."

"May I see it, please?"

"Did Joe and Jane discuss the question of having children before they were married?"

"Yes, and they decided not to have any till afterward."

A small boy hurried home from school one afternoon and announced to his parents that the class he was in was about to split up into two divisions.

"I'm in the top one," he explained, "and the other one is for backward readers."

"But," he went on confidentially, "we don't know who is going to be in the other one, because there's not a kid in the room who can read backwards."

". . . but I wanted a toy one!"

Harvey Slocum Dies at India's Bhakra Dam

by Ray Day

HARVEY belongs to the ages. M. Harvey Slocum, one of dam building's all-time greats, is dead. He passed away November 10 in the midst of what he viewed as the world's biggest and most difficult construction job—the Bhakra-Nangal dam in India.

Slocum, chief consultant on the Bhakra project since 1955, suffered a stroke on October 24, and had been convalescing at the dam site, 200 miles north of New Delhi. One of India's highest paid workers, his contract provided that he need stay on the job only six months each year. But he usually stayed longer, commuting occasionally between India and his home in Alhambra, Calif. His body was flown back to the United States.

M. Harvey Slocum

Born in National City, Calif., 74 years ago, Slocum rose by his own bootstraps to become one of the world's greatest specialists in dam building. During his early years he tried cabinetmaking and structural steel building, but nothing held the challenge, for him, of a big dam. To him, it exemplified man's battle against nature.

Friant dam; Bull Shoals; the difficult first phase of Grand Coulee; and many others stand as monuments to the man who advanced building with cantilever cranes to a high art.

India's Prime Minister Nehru, in Los Angeles while on a U. S. tour last month, expressed his country's loss.

"Mr. Slocum's loss will long be felt," he said. "He was a great friend to my country and my people. His dedication to his work at Bhakra set a living example which will long be remembered."

Imaginative and ingenious in his applications of construction machinery and methods, he was ultra conservative as a citizen and in his political beliefs. The driving force in his life was water and its conservation.

"Man's search for water," he once said, "has been the greatest economic and cultural force in all history. And it will continue to be."

Slocum was nearing normal retirement age as Bull Shoals dam neared completion in Arkansas. All the problems had been whipped. Slocum, as usual, became restless with the mop-up routine. When the Indian government sent its emissaries to Bull Shoals to persuade him that his destiny lay more than halfway around the world, he found it impossible to resist the challenge of 740-ft. high, 1,000,000-kw Bhakra dam, which plugs a 700-ft. gorge of India's Sutlej river. With a force of 35 experienced American construction men, Slocum was soon pushing construction with his usual vigor.

In his fertile mind, and with the cooperation of many American manufacturers, he worked out some of the most advanced safety features ever seen on construction work. Automatic load-limit cutoffs, dead-man controls, foolproof hoists and travel stops were built into the Bhakra cranes. Single-handed, Slocum preached and persuaded until he broke down much of India's caste system. He speeded up transportation and communications, and made some good construction stiffs from local labor.

During all the years at Bhakra, Slocum still was active in U. S. dam building. He was called upon frequently, by American contractors, to consult and give estimating help on many dams now under construction. At the last, he was estimating and studying another great dam proposed for the Punjab.

Slocum is survived by his wife, Helen, of 504 E. Pine St., Alhambra, Calif. She was with him at the end.

More News on page 38 . . .

These Special Excavating Jobs Are Best Handled by Sauerman DragScrapers

Deep Digging

900-FT. SPAN— 65 FT. BELOW WATER...

Load is deposited by tensioning the track cable, thus lifting the DragScraper from the pile. Tensioning continues to the desired height for releasing the DragScraper and returning it by gravity to the pit.

Operator controls digging and hauling from cab in head tower.

"the 10-yd. DragScraper is doing a wonderful job and we could not operate without it..."

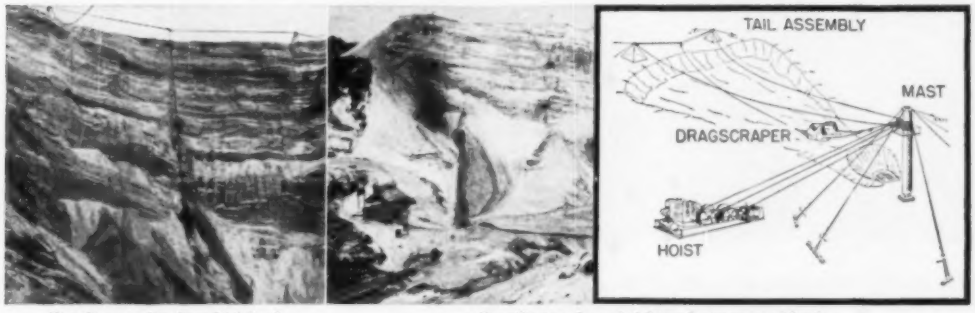
Louis Chinelli, Gen. Supt. Redman Concrete Corp.

Redman had been trucking material at a cost of $35,000 a year to the location where the DragScraper is now placing it. The 10-yd. Sauerman covers a pond area of 1500′ by 3000′ and is digging 40 ft. deeper than their previous dragline could operate.

The DragScraper digs and hauls on a 900-ft. span. It operates between a 90-ft. fixed head tower and a 40-ft. mobile tail tower which may be shifted to change the line of operation. The company's 1000-yd.-per-day batch plants and its fleet of mixers and trucks are kept busy by the steady flow of material supplied by the DragScraper.

High Bank Digging

175 FT. HIGH— 600-FT. HAUL...



DragScraper digs from high bank.

Overall view shows height and steepness of bank. Diagram shows details of Sauerman installation.

"I have nothing but praise for our 4-yd. Sauerman Machine. Since the DragScraper began operations in 1952, we have worked it continuously 12 hours a day..."

John D. Robertson, Gen. Supt. Chandler's Palos Verdes Sand & Gravel Co.

By working down from the top of the 175-ft. bank, the material flows ahead of the DragScraper. This provides bonus loads on each haul and substantially lessens the danger of cave-ins.

Operating cables are powered by a Sauerman three-drum electric hoist. Equipped for rapid shifting, the DragScraper can be quickly positioned to any line of operation between the two tail towers at the top of the bank and the headpost at the hopper.

The plant is the largest sand producer in the South Los Angeles area and, together with two ready-mix plants, keeps 22 ready-mix and 18 dump trucks busy.

The best Sauerman Machine for your plant is governed by the nature of the deposit, location of material, the depth and plant layout. Consult Sauerman engineers about your plant. Their recommendations will be based on fifty years of excavating machinery experience. Ask for Catalog A (DragScrapers). Sauerman News Nos. 149 and 150 describe the above installations in greater detail.

SAUERMAN BROS. INC. 622 SOUTH 28TH AVENUE • BELLWOOD, ILLINOIS

CRESCENT SCRAPERS • SLACKLINE and TAUTLINE CABLEWAYS • DURDLITE BLOCKS

GRAB JOBS from "Break-Even" Bidders . .
"Live-Track" power-steering, plus On-the-Go

To make a turn, you simply change the speed of a TD-25 track with "live track" Planet Power-steering. This way, you keep full power and traction on both tracks to assure full-load turning. Load-limiting "dead-track drag" doesn't sabotage your bids.

To handle big offset loads, or to counteract the side draft of benching without sluing or "bank-nosing," simply shift the TD-25's load-side track to high range; leave the other track in low. You stay on course, deliver full loads or make full cuts, full time.

To keep full loads on the move, full time, through tough or easy going, use instant-acting, on-the-go Hi-Lo, power-shifting. Cut-to-fill matching of power to condition goes far to prevent payload spillage. Fast, easy TD-25 power-shifting is a built-in bonus of Planet Power-steering!

For constant-contact push-loading, apply full TD-25 power with planetary track control, get full speed and production without scraper-mauling impact. Prevent push-block banging damage.

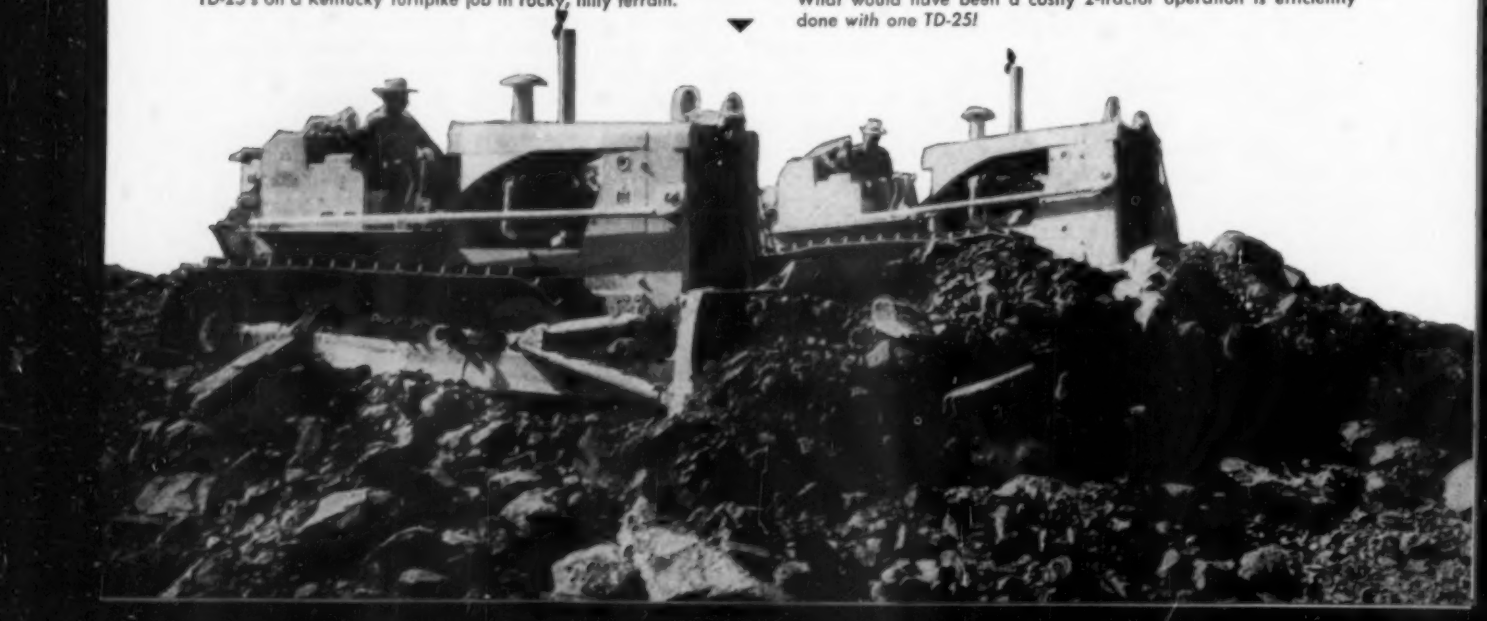
Prove to yourself how turning affects earning. See how TD-25 advantages let you grab jobs from "break-even" bidders and still make profits. Let your International Construction Equipment Distributor demonstrate!

International® *Construction Equipment*

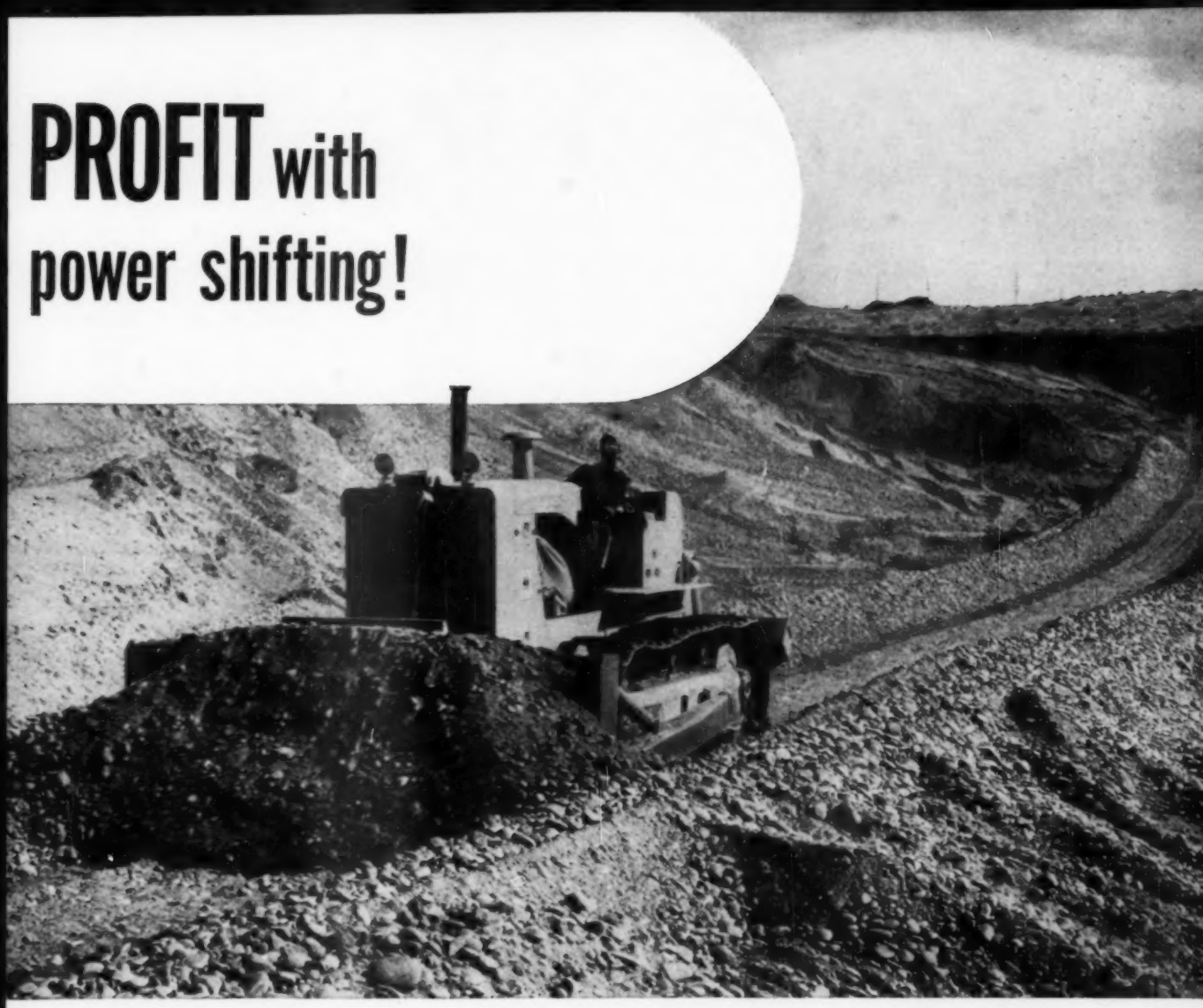
International Harvester Co.,
180 North Michigan Ave., Chicago 1, Illinois
A COMPLETE POWER PACKAGE

"On course" steering with offset loads means full-capacity production even in rock-laden material. To prevent needless zigzagging and loss of momentum, a "25" operator simply changes the speed of one track to put extra power leverage where needed to meet changing conditions. These two machines, pioneering a 107-foot deep cut, are members of a fleet of seven International TD-25's on a Kentucky Turnpike job in rocky, hilly terrain.

Pushes of over 600 feet pay off for this New Mexico contractor—producing sub-base gravel for a North Albuquerque highway. Instant speed control of either or both tracks with the planetary transmission means positive load-control—to heap "ripped" gravel and "run" to the crusher hopper. Then the "25's" high reverse of 7.5 mph means fast back-up for the next push. What would have been a costly 2-tractor operation is efficiently done with one TD-25!



PROFIT with power shifting!



Steady full-power traction on both tracks full time assures ample push to beat the grade and handle big loads of tractor-ripped bentonite at an Arizona mine. This TD-25 keeps busy removing overburden, ripping and stockpiling the ore. Only the "25" gives you the power-wallop of the free-breathing, dual-valved DT-817 diesel—with 230 turbocharged hp. Push-button direct starting saves operating time—operator effort!

Planetary track speed control lets you turn heavy offset loads or push straight ahead with them—without profit-robbing spillage or time waste. See how this planet-drive "25" beats king-sized clutch-steered crawler capacity with 2-finger ease—overcoming the sidedraft of bulldozing random-dumped dirt and boulders on a Virginia road job. And right where clutch-steered king-sized crawlers waste power and momentum, TD-25's can heap-load scrapers in record time!

YOU EARN WITH WHAT YOU CAN TURN WITH!

News . . .

Continued from page 34

Moles Announce Award Winners

Dr. Karl Terzaghi of Winchester, Mass., internationally known pioneer in soils mechanics, and George F. Ferris, board chairman of Raymond International, have been named as the 1962 recipients of the awards given annually by the Moles for "outstanding achievements in construction."

The announcement was made at a New York City dinner meeting of the Moles, an association of leading figures in the tunneling, dam-building and heavy construction industry. Formal presentation of the honors will be at the annual Moles' Awards dinner at the Waldorf-Astoria Hotel January 31.

G. F. Ferris

Karl Terzaghi

Dr. Terzaghi and Ferris make up the 22nd pair of honorees in a series that started in 1941 and numbers among its winners former President Herbert Hoover, Robert Moses, Admiral Ben Moreell, Peter Kiewit, Harvey Slocum, John Bruce Bonny and Lou Perini.

Considered the highest recognition that can be accorded for service to the American construction industry, the award is made annually to one member and one non-member.

Dr. Terzaghi, who was born in 1883 in Prague, then Bohemia, has had wide experience both in teaching and in the execution of significant engineering projects in Europe and in this country. He first came to this country in 1912 to study earth-work engineering data accumulated by the U. S. Reclamation Service. He became a United States citizen in 1939.

Some of the projects on which he served were the construction of the Chicago subway system; subsidence of the city of Mexico for the Mexican government; construction of Kenney dam for the Aluminum Co. of Canada; the Sariyar and Seyham dams in Asia Minor; the Serre Poncon dam across the Durance Valley in France; and the Aswan dam in Egypt.

Ferris, a 1924 engineering graduate of the University of Florida, has been board chairman of Raymond International since 1960. He came to New York in 1929 with the Turner Construction Co. For the next ten years he served as superintendent on major projects in the New York metropolitan area, and in Maryland and Illinois.

Ferris joined Raymond, then known as Raymond Concrete Pile Co. in 1946; he was elected president in 1953, and board chairman in 1960. He played principal roles in organizing and managing the $350 million Spanish military bases program; the huge Hyperion outfall project off Los Angeles; and the spectacular bridge-and-tunnel crossing of Lower Chesapeake Bay, now under construction.

California's Trinity Dam Is Dedicated

Trinity dam in northern California, a major feature of the Bureau of Reclamation's Central Valley Project and the world's highest completed earthfill embankment, was dedicated on October 14.

Secretary of the Interior Stewart L. Udall delivered the principal address at the dedication. The event was sponsored by the Trinity Conservation and Recreation Development Assn.

The 537-ft. high earth dam on the Trinity river near Lewiston, Calif., was authorized by Congress in 1955 and has been under construction since April, 1957 under a $49 million contract to Trinity Dam Contractors. Guy F. Atkinson Co. is sponsor of the joint venture. Other participants include Ostrander Construction Co.; M. S. Bevanda Corp.; A. Teichert & Sons; and Charles Harney, Inc.

The dam is a feature of the $245 million Trinity Division of the Central Valley Project, including two major tunnels that will carry water through the mountains from Trinity river to the Sacramento river basin, Whiskeytown dam and three major power plants. The division is scheduled to be completed by mid-1964.

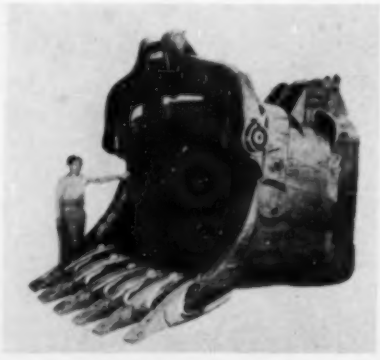
Trinity dam was topped out a year ago at its final structural height, six months ahead of schedule, when the contractors completed placement of 33 million cubic yards of earth and rock.

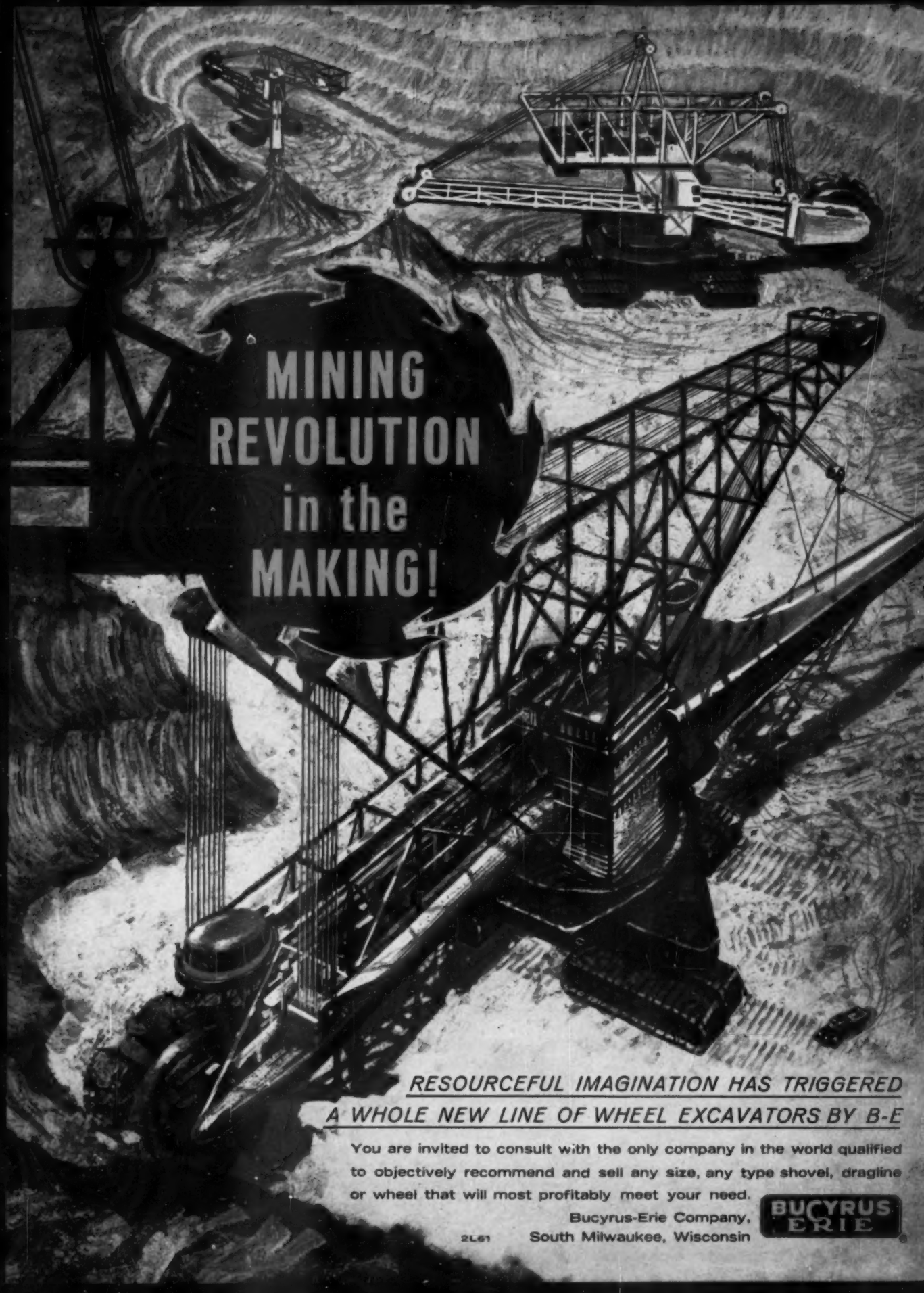
Big 11-Yd. Dippers Dig Taconite

Four large power shovel dippers have been cast and delivered to a large iron mine by American Manganese Steel Div., American Brake Shoe Co., Chicago Heights, Ill.

Each of the dippers will be capable of holding 11 cubic yards of taconite ore. They are cast in three pieces of manganese steel and weigh, complete as shown, 42,290 pounds each. The dippers are each 8 feet high and 7 feet 11 inches wide.

Dippers of this size are among the largest that can be cast successfully, although Amsco has in the past made buckets up to 18 yards. Larger sizes are usually fabricated. The Simplex teeth on the dippers are reversible and replaceable.





RESOURCEFUL IMAGINATION HAS TRIGGERED
A WHOLE NEW LINE OF WHEEL EXCAVATORS BY B-E

You are invited to consult with the only company in the world qualified to objectively recommend and sell any size, any type shovel, dragline or wheel that will most profitably meet your need.

Bucyrus-Erie Company,
South Milwaukee, Wisconsin

2L61

BUCYRUS ERIE

TRIAL SAMPLES
Of World-Famous WHITMORE'S Lubricants

OPEN CHAIN LUBRICANT
INCREASES CHAIN LIFE UP TO 300%

Penetrates, lubricates, prevents rust. Lubricates deep into chain linkage to reduce friction on pins, rollers, bushings, pressure surfaces. Corrosion inhibitor prevents rust in vital working mechanisms. Lubricates close-tolerance internal surfaces to increase chain life up to 300%. Highly recommended for all climatic conditions to stop rust and corrosion even in salt atmospheres.

Packaged in handy 16 oz. aerosol spray-on containers or in bulk—send for a free trial sample.

ANTI-FRICTION COMPOSITIONS
HAVE NO MELTING OR DROPPING POINT

Packaged in 14½ oz. cartridges for handy application with lever-type cartridge guns for constant protection to roller, ball, sleeve bearings and sliding surfaces in "hot" bearing applications or in areas with high ambient heat. Exclusive formulas have no melting or dropping point; moisture resistant; will not wash out; exceptional metal adherence properties; temperature reducing qualities; high extreme pressure values. Available in two grades. Whitmore's Anti-Friction Composition No. 1 (light density), recommended for high speed, high temperature applications. Anti-Friction Composition No. 2 (heavy density), for low-speed high-temperature applications or loosely-fitted bearings. Specify No. when requesting free trial sample.

68 YEARS OF LEADERSHIP LUBRICATING THE FOLLOWING:

- Open Gears, Dipper Sticks, Cams
- Open and Enclosed Chain
- Speed Reducers
- Enclosed Gear Cases
- Roller, Ball and Sleeve Bearings
- Wire Rope and Cable
- Hydraulic Units, Torque Converters

Est. 1893
THE WHITMORE MANUFACTURING CO.
LUBRICATING ENGINEERS
CLEVELAND 4, OHIO • VULCAN 3-7272

NEW Trade Literature

Subject: **Tractor Backhoe**

Content: A 4-page folder shows features of the new Ottawa LX backhoe for Caterpillar wheel loaders. The booklet features Ottawa's Hydra-Hitch that allows the removal or attachment of the backhoe to the loader in only 30 seconds. Another feature illustrated is the dirt ejector bucket that automatically exerts a 10,000-lb. hydraulic force to clean sticky material out of the bucket. Ask for form CLX-6112.

Where to get: Equipment Div., Young Spring & Wire Corp., Department EE, Bowling Green, Ohio.

Subject: **24-yd. Scraper**

Content: Euclid's model S-24 scraper, which has a payload capacity of 24 yards struck and 32 yards heaped, is described in a 16-page 3-color folder. Exploded and cutaway views explain basic design features, including the GM 12-cylinder 432-hp diesel engine; Torqmatic drive; hydraulic operation of bowl, blade and ejector; and other major components. Condensed specifications and charts show grade ability and estimated hourly production on hauls of varying length. Ask for form No. 514.

Where to get: Euclid dealers or Euclid Div., General Motors Corp., Department EE, Hudson, Ohio.

Subject: **Tractor Parts Exchange**

Content: Swift replacement of machine components at only the cost of repair is the main advantage to equipment owners of the Parts Assembly Exchange Program offered by Caterpillar dealers. Complete explanation of the program is offered in *Avoid Delay the Modern Way*, a new Cat 8-page booklet. A machine owner orders a needed replacement assembly from his dealer. The dealer delivers the rebuilt component, taking the customer's unit into the shop to be put in working condition. The owner then is billed for repair costs on his old unit, which are about the same as if he had repaired the assembly himself.

Where to get: Caterpillar Tractor Co., Department EE, Peoria, Ill., or Caterpillar dealers.

Subject: **Eimco Loader**

Content: A full color bulletin on the Eimco 123 front end loader features working pictures; a cut-a-way

diagram of the power train; and highlights of construction features. Condensed specification for this 122-hp diesel engine powered loader are also offered. Ask for bulletin L-1175.

Where to get: Eimco Corp., Department EE, P. O. Box 300, Salt Lake City 10, Utah.

Subject: **Manganese Castings**

Content: To help buyers make intelligent decisions when it comes to the purchase of wear parts, Amsco has issued an informative 16-page booklet, *Facts About Manganese Steel Castings*. It explains how AMSCO builds impact and abrasion resistance into castings through heat treating and use of alloys.

Where to get: American Manganese Steel Div., American Brake Shoe Co., Department EE, Chicago Heights, Ill.

EQUIPMENT YOU OUGHT TO KNOW ABOUT

Truck Crane Converts to Tower Crane Operation

Marion's new "Mobiltower" combines the versatility of a truck crane and the advantages of a tower crane.

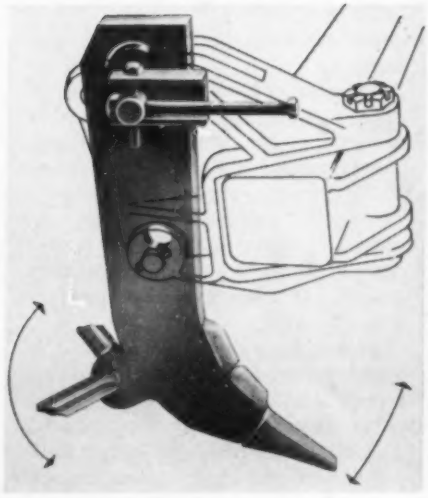
It is basically a 30-ton, Type 37-M truck crane. Mounted on an 8 x 4 carrier with hydraulic outriggers, it can handle loads of from 10,000 pounds at a 20-ft. radius, to 5,000 pounds at a 60-ft. radius at heights of 107 to 150 feet. The tubular T-1 steel boom with tubular lacing does double duty as both the tower and as a conventional boom. The standard type jib also doubles as either the tower jib or as a conventional jib connected to the boom point.

Equipment required to convert the 37-M from standard crane to Mobiltower crane includes 2½-ft. insert with jib connection for main boom; hoist line fairlead; jib bridle; boom point deflecting sheaves; boom stop extensions and stabilizers; and wheel-mounted outriggers.

The boom and jib can be lifted from a horizontal position without any assistance or anchor rigging. The boom or tower can be raised or lowered in four minutes. Power load lowering is standard for both main hoist drums; the right hand drum is used for the hoist line (¾-in. cable) while the left hand drum is used for the tower jib hoist line (also ¾-in. cable). The main boom can be lowered from near vertical to any lower angle within the rated capacities of the machine.

Manufacturer: Marion Power Shovel Co., Department EE, Marion, Ohio.

Ripper Has Cam-Lock Feature



A new "Rapid-Adjust" cam lock ripper with one-piece ripper point has been introduced by H & L Tooth Co.

Both ripper shank and one-piece point are forged of special high alloy steel and formed under heat to create proper grain flow for strength. Newly formulated steel and recently devised heat-treating process give added hardness and wear-resistance.

The operator can achieve four ripping angles with ease and speed, eliminating man hours lost in standard angle-changing and reducing on-the-job inventories. Forward or rear position is obtained by simple adjustment of the cam lever. Two additional angles are achieved by reversing the Flexpin attached point. Twin wear plates increase shank life several times, and cut replacement costs by permitting reinstallation at point of maximum wear. They are replaceable and available separately or as a set.

In conjunction with the Rapid-Adjust cam lock ripper and one-piece point, H & L is now marketing a new drop-forged alloy cutter wing that efficiently loosens difficult and compacted materials. The cutter wing has a bracket which is welded onto any ripper shank.

Manufacturer: H & L Tooth Co., Department EE, 1540 S. Greenwood Ave., Montebello, Calif.

Tractor Canopy Floats on Rubber

Portland Wire and Iron Works' latest model Tube-Lok tractor canopy features an entirely new mounting principle. It is devised to give greater safety to operator and equipment, plus longer life to the canopy.

"Floating" action is derived from use of rubber shock blocks at the foot end of each of the four vertical canopy columns. This mounting principle allows canopy to float free from metal-to-metal contact with the tractor at these four crucial points.

The flexible mounting relieves structural stresses and dampens heavy shock blows. The main benefit to the operator is quieter operation. This flexibility also lessens maintenance and repair to the tractor canopy.

Manufacturer: Portland Wire & Iron Works, Department EE, 4464 S. E. 17 Ave., Portland 2, Ore.

Small Gasoline -

Electric generating plants, ranging from one to five kilowatts in capacity, have been introduced by Tait Mfg. Co. Models are compactly designed for easy portability, making them ideal for use by contractors.

Seven units comprise the line. As rated by capacity, the models are 1, 1½, 2, 2½, 3, 3½, and 5 kilowatts. Weight ranges from 65 to 395 pounds.

The gasoline engines are 3,600-rpm units, with nation-wide service available.

Manufacturer: Tait Mfg. Co., Department EE, 550 Webster St., Dayton, Ohio.

65 - Ton End - Dump

A new Haulpak truck has a 65-ton load capacity. LeTourneau-Westinghouse says its model 65 is the world's largest capacity, single rear axle, end-dump truck.

The Haulpak 65 is a refinement of the model 60. Because of high yield strength steels, and fabricated units in construction, the truck weighs only 69,850 pounds empty, which is only 54% of its pay load. It is powered with a Cummins VT-12-700 Turbo-charged engine, with transmissions available to accommodate this horsepower.

In designing the 65 Haulpak, LW engineers moved the cab forward and arranged the frame to accommodate either a rock body or a coal body. This interchangeability of bodies, with considerably different yardage capaci-

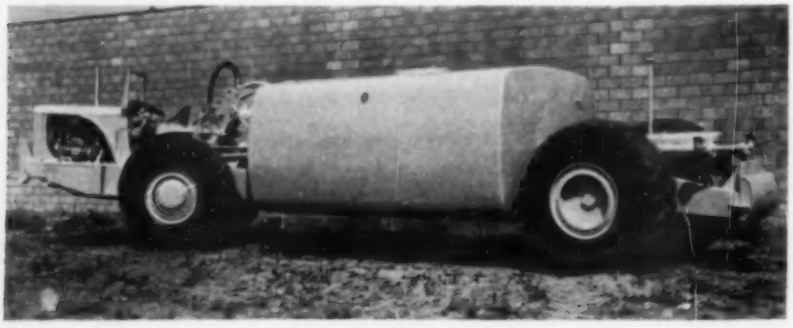
Tractor - Towed Sprinkler

This 7,300-gallon water tanker mounted behind a 2T-75 International tractor is an example how Klein tanks are adaptable for use behind all rubber-tired prime movers.

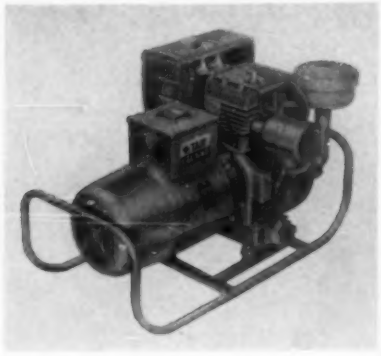
Water output is rated at 1,500 gpm with gasoline or diesel auxiliary pump engine.

Front and rear spray heads each individually air controlled from tractor cab permit uniform water coverage of large areas or spot wetting as desired.

Manufacturer: Klein Welding Service, Inc., Department EE, 14618 E. Arrow Highway, Baldwin Park, Calif.



Powered Generator



Capacity Truck

ties and the same tonnage ratings, is the most significant single change in this new model.

The rock body (right illustration) has a capacity of 42 cubic yards struck, and will haul a payload of 65 tons. The capacity of the coal body (left illustration) is 66 cubic yards struck, and 65 tons.

The Haulpak design eliminates conventional axles and springs. Four big pistons in the "Hydrair" suspension system act like giant shock absorbers. The truck is easy and safe to handle, with full power steering and power brakes. The short 160-in. wheel base makes it extremely maneuverable, and the turning circle on the front wheel track is only 55 feet.

Manufacturer: LeTourneau-Westinghouse Co., Department EE, Peoria, Ill.

Will Never Owe You Anything!

Your OWEN Clamshell Bucket starts making money for you from the first hefty mouthful it bites off . . . and keeps on making money because its rugged construction "stands up". It's the bucket with "The Big Bite that's Just Right!"

The OWEN has a strong appetite for work—an appetite that is never satisfied. These are exclusive features that keep it working for you:

Block and Tackle Type Reeving — **Recessed Lips**
One-piece Head Construction — **Single Main Shaft**
Riveted Bowl Assembly

Prompt service through ample inventory on new equipment and parts.

Write for OWEN information on how these features can make money for you.

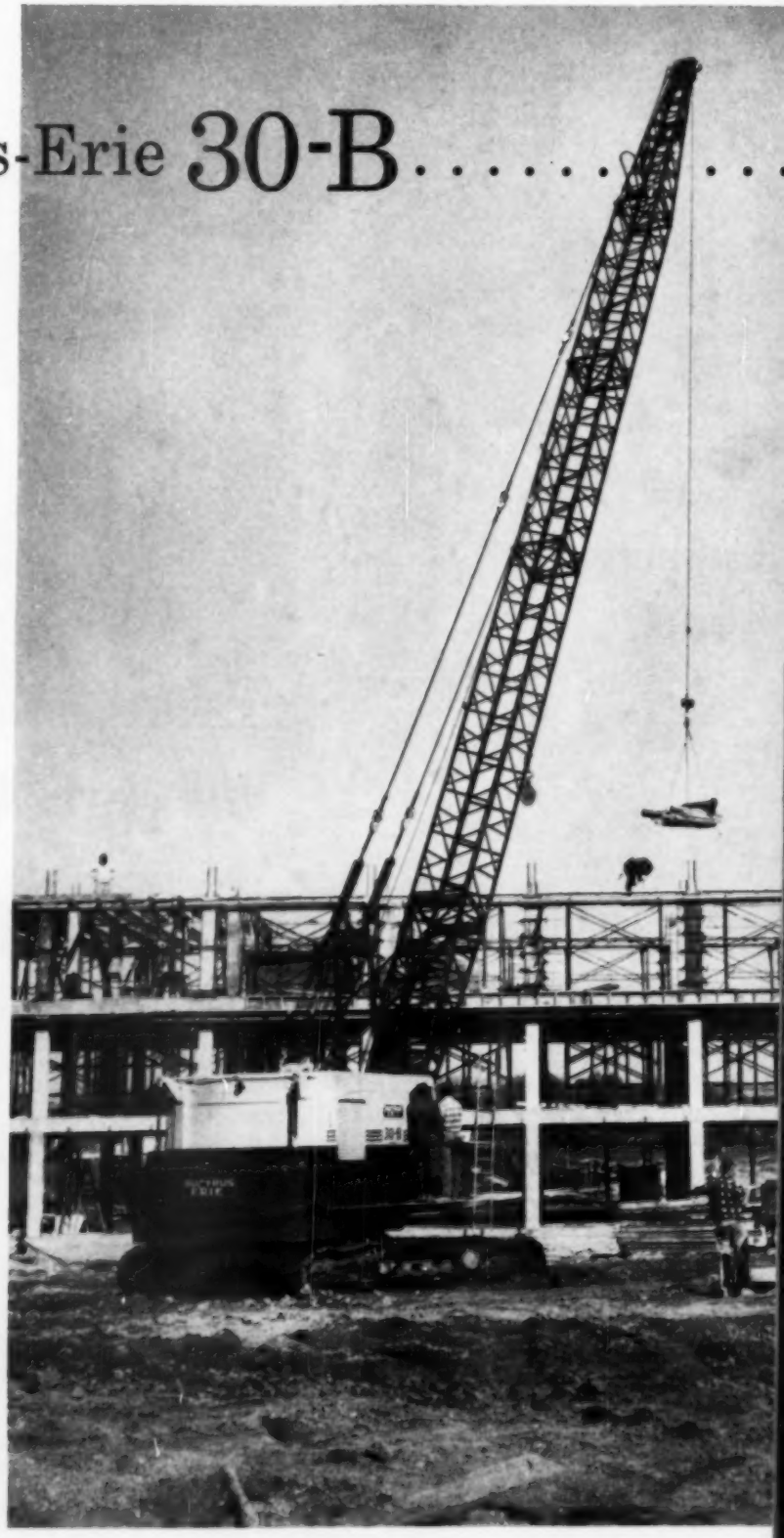
The OWEN BUCKET COMPANY
BREAKWATER AVENUE • CLEVELAND 2, OHIO
BRANCH OFFICES: New York • Philadelphia • Chicago • Berkeley, California • Fort Lauderdale, Florida

10 ways these SUPERcranes

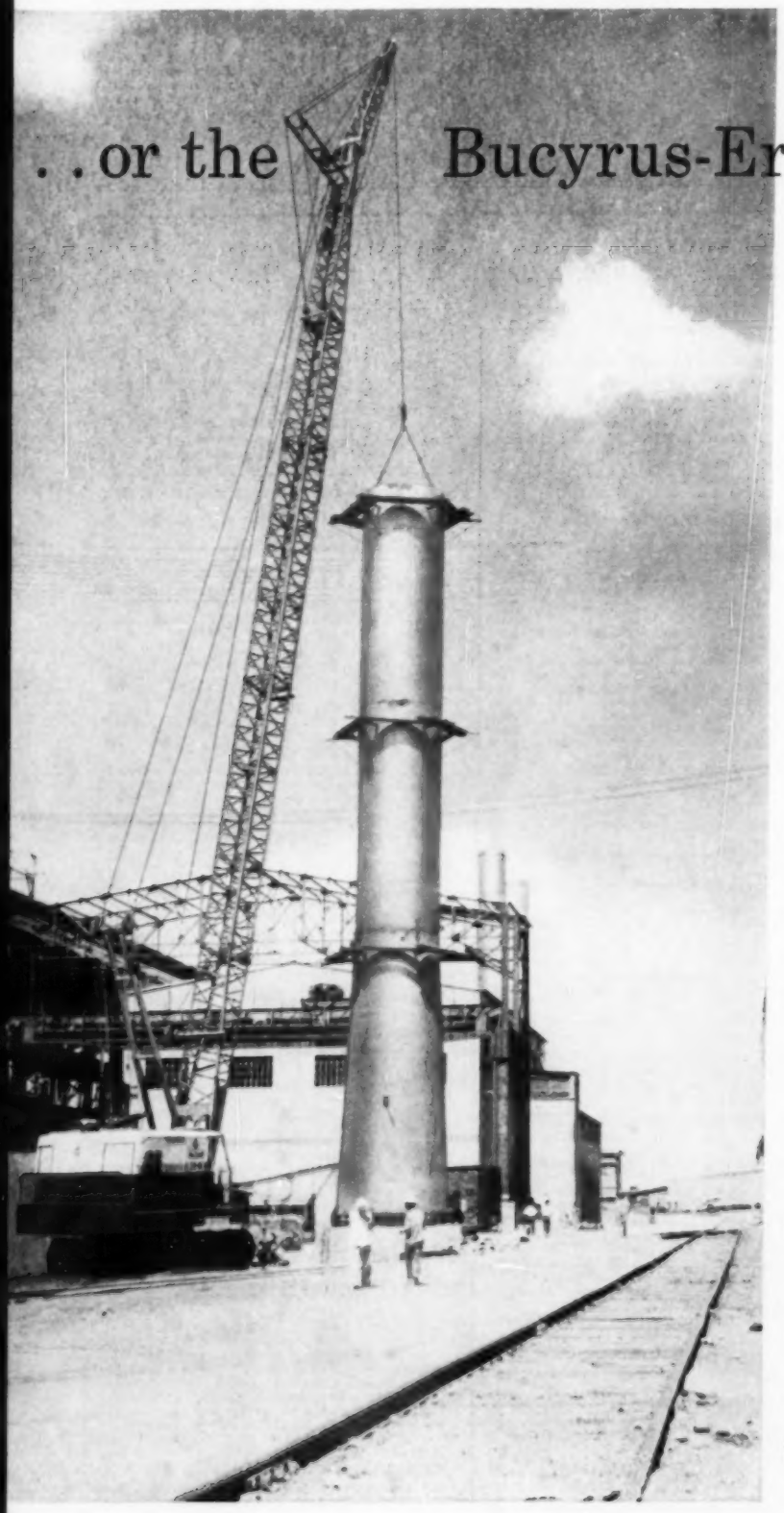
The Bucyrus-Erie 30-B . . . . . .

1. 50-ton lifting capacity at 12-foot radius — over side of crawlers.
2. 15-foot-long crawlers (available with 30- or 36-inch treads) extend to 15′ 2″ width for virtual square base offering maximum stability.
3. Extra-long reach. Up to 160 ft. with jib.
4. Rugged steel boom (alloy steel tubular boom optional). Optional pin connections.
5. Independent boom hoist with large clutches for raising and lowering.
6. Optional two-lever control torque converter provides constant power output under varying load conditions.
7. Optional hydraulic counterweight removal device facilitates knockdown for between-job moves.
8. Independent propel optional.
9. Optional boom angle limit control automatically restricts boom angle within desired limits.
10. Hook rollers have anti-friction bearings for smooth swinging with maximum load, anti-friction bearings in point sheaves.

For precision crane work, see the Bucyrus-Erie HYDROCRANE®. . . with telescoping boom, hydraulic outriggers and high-speed mobility.



reach for GREATER profit



. . or the Bucyrus-Erie 38-B

1. 60-ton lifting capacity at 12-foot radius over end or side.
2. Extra-long reach. Up to 200 ft. with jib.
3. Independent power-controlled boom hoist for precision raising and lowering.
4. Long, wide crawler base provides maximum stability.
5. Aircraft-type alloy steel tubular boom standard.
6. Optional hydraulic counterweight and crawler side frame removal device offers fast strip-down for job-to-job moves.
7. Independent propel and third drum optional.
8. Top-quality materials used throughout: Example: Cast alloy steel crawler frames for maximum strength under full-capacity lifts.
9. Offers exceptionally low cost per pound of capacity — maximum return from your investment.
10. Two-lever twin governor control torque converter (optional). 26E61

Compare these features before you buy any crane

BUCYRUS-ERIE COMPANY

SOUTH MILWAUKEE, WISCONSIN

World's Largest Manufacturer of Cranes and Excavators

TO ADVERTISE: All advertising in this section is payable in advance. Rate $1.00 per line, or $12.00 per inch of 12 lines. Minimum charge $4.00. No discounts; no commissions. Please count your copy carefully to avoid delay. Each line contains 41 characters. Count spaces and punctuation as one character each. Be sure to enclose the correct amount of money with your order. Rates and conditions subject to change without notice. Closing date—10th of preceding month. Example: January closes December 10th.

TO INQUIRE: Be sure to address your inquiry to the advertiser by using the listed address. If box number is used, mail your letter in care of Excavating Engineer, South Milwaukee, Wisconsin. Write each advertiser a separate letter. Do not write us for name and address of advertiser. This information will not be given out. We have no information about the equipment advertised other than that shown in the advertisements themselves.

LARGE SHOVELS, CRANES, DRAGLINES — 3 YDS. & UP

STRIPPING EQUIPMENT
Bucyrus-Erie 950-B 30-yd. electric shovel.
Page 625 walking dragline, 1954 model.
Bucyrus-Erie 40-R drill mounted on 50-R lower works.
9—Euclid 32-ton bottom-dumps with 200-hp Cummins engines.

POWER SHOVEL CO.
4913 Massachusetts Ave.
Indianapolis 18, Ind.
Phone: LI 7-9636

EUCLIDS
Rear, Bottom and Scrapers
12-yd. Bucyrus-Erie dragline.
9-yd. Bucyrus-Erie dragline.
8-yd. Bucyrus-Erie shovel.
6½-yd. Bucyrus-Erie shovel.
4-yd. Bucyrus-Erie shovel.
4-yd. Bucyrus-Erie dragline.
3-yd. Bucyrus-Erie shovel.
2½-yd. Bucyrus-Erie shovel and dragline.
1½-yd. Bucyrus-Erie shovel.
5-yd. Manitowoc shovels and drags.
6-yd. Lima dragline and shovels.
Large stripping shovels.

Other equipment available, not listed above.

WILLIAM LUBRECHT, III
Construction Equipment
311 W. Diamond Ave. Hazleton, Pa.
Phone: GLadstone 5-4041 or 5-0523

Bucyrus-Erie 200-W diesel dragline with 125-ft. boom and Cooper-Bessemer diesel engine. Two 6½-yd. and one 6-yd. Page buckets included. Spare parts available at reasonable price. Excellent condition. Located in Middle West.

EXCAVATING ENGINEER
Box 3771 South Milwaukee, Wis.

Bucyrus-Erie model 120-B electric shovel, 29' 6" boom, 22' handle, 4¾-yd. dipper, 36" treads, for 3/60/2300 volt service. Large quantity spare parts included. Location New York state.

EXCAVATING ENGINEER
Box 3773 South Milwaukee, Wis.

Bucyrus-Erie 10-W diesel dragline, two Caterpillar engines, 185-ft. boom, 10-cu. yd. bucket, spare parts included, good condition. Location Arkansas.

EXCAVATING ENGINEER
Box 3776 South Milwaukee, Wis.

LARGE SHOVELS, CRANES, DRAGLINES — 3 YDS. & UP

HEAVY EXCAVATION EQUIPMENT
DRAGLINES, SHOVELS, CRANES, DRILLS, TRUCKS

1150-B B.E. 25-yd. Elec. Drag.
9-W B.E. Diesel & Elec. Drags, 8, 10 and 12 yd.
7-W B.E. Diesel Drag, 140', 7 yd.
7400 Marion Diesel Drag, 175', 12 yd.
7400 Marion Elec. Drags, 175', 12; 200', 9-yd.
625 Page Diesel Drag, 150', 9, 10 & 10½-yd.
631 Page Elec. Drag, 200', 8 yd.
621-S Page Diesel Drag, 125', 7 yd.
183-M Marion Diesel Drag, 130', 8 yd.
240-W B.E. Diesel Drag, 125', 6 yd
2400 Lima Diesel & Elec. Drags, 130', 6-yd.
4500 Manitowoc Drags, 120', 5; 140' 4 yd.
120-B B.E. Elec. Drag, 115', 5 yd.
3900, 3500 & 3000 Manitowoc Cranes.
111-M Marion Drag, 100', 4 yd.
1055 P&H Diesel Drag, 80', 4 yd.
1601 Lima 4 yd. Shovel/Drag.
1201 Lima Drag, 85', 3 yd.
54-B B.E. Drag, 80', 2½ yd.
950-B B.E. 30-yd. Elec. Shovel.
5560 Marion 26 yd. Elec. Shovel.
5323 Marion 18 yd. Elec. Shovel.
190-B B.E. 8 yd. Elec. Shovel.
170-B B.E. 6 yd. Elec. Shovels.
151-M Marion 7 yd. Elec. Shovels.
1600 P&H & 4161 Marion 6 yd. Elec. Shovels.
2400 Lima 6 yd. Std. & H.L. Shovels.
75-B B.E. 5 yd. Elec. Shovel.
120-B B.E. & 4121 Marion 4 yd. Elec. Shovels.
111-M Marion Std. & H.L. Shovels.
1201 Lima & 54-B B.E. Standard Shovels.
#6 Northwest & 80-D N.W. Std. Shovels.
T-650 REICHdrill Truck Mtd. Rotary & In-The-Hole.
40-R B.E. Electric Rotary Drill.
Ingersoll-Rand Truck & Crlr. Mtd. Drill-masters.
Euclid Trucks, Dozers, etc.

FRANK SWABB EQUIPMENT CO., INC.
313 Hazleton National Bank Bldg.
Hazleton, Pa. — GLadstone 5-3658

P&H model 955 diesel dragline and cranes, Waukesha 6WAKD engine, 70' boom, long wide crawlers, location in Middle West.

EXCAVATING ENGINEER
Box 3772 South Milwaukee, Wis.

SMALL SHOVELS, CRANES, DRAGLINES — UP TO 2½ YDS.

Northwest model 80-D shovel—very good condition. Serial No. 19851 (1958). Equipped with 2½-yd. dipper; model 21 Murphy diesel engine; 15'-10" crawlers and 30" pads. Located Detroit area.
Contact: Mr. E. J. Connelly.

EDW. C. LEVY CO.
8800 Dix Ave. Detroit 9, Mich.
Phone: VI 3-7200

Bucyrus-Erie 54-B shovel #51079, Buda Lanova diesel engine.
Bucyrus-Erie 54-B shovel #100426, GMC 6-110 diesel engine.
Caterpillar DW20 scraper #11C880.

W. I. CLARK CO.
P. O. Box 301 New Haven, Conn.
Tel. CH 8-2131

2—Lorain 820 undercarriages.
1—Lorain 82 undercarriage.
1—Shovel front w/2-yd. AMSCO dipper.
2—Waukesha model 6WAKD engines, complete, take-outs.

GOOD TRUCK CRANE
1—Bay City 180T66, 6x6, 110' boom $10,500.

WANTED
P&H 655 & Lorain 82/820 machines.

RETIG DISTRIBUTORS (Est. 1946)
550 Fifth Avenue New York 36, N. Y.
JU 2-4150

2—Lima truck cranes, type 44T, 30-ton recent models, excellent condition.
1—Bucyrus-Erie 51-B diesel shovel.
1—Bucyrus-Erie 54-B diesel shovel.
Group of seven Euclid 8TD rear dump units with 56BY bodies, 16 cubic yards.
Rex pumpcrete machine model 160-S, with assortment of 6" pipe and miscellaneous fittings.

Write:
EXCAVATING ENGINEER
Box 3779 South Milwaukee, Wis.

Caterpillar #12 motor grader 8T20,000 series, less than 3,000 hrs.
American 50-T rubber-tired roller. New guarantee.
Cat D8 Crossville clearing dozer.
Allis-Chalmers HD5 loader.
International TD18A loader with Drott bucket.
American 60" double-drum sheepsfoot roller. New, big discount.
Bucyrus-Erie 22-B shovel front.

SAM TAYLOR EQUIPMENT
Highway 77 North—4315 N. Cliff
Sioux Falls, S. D.

B-E model 38-B shovel; s/n 118979, 2¼-yd. coal bucket, 19'2" handle instead of standard, GMC 6-71 diesel engine w/torque converter, light plant. Very good condition. Price $33,500 FOB job site.
B-E model 54-B stripping shovel s/n 119131. 2½-yd. bucket, Cat D337 diesel engine w/Clark Torcon converter, light plant, high "A" frame, long frames and 36" treads. 20,000 lbs. extra counterweight. 9400 hrs. Excellent condition, price $66,500 FOB job site.
Both machines purchased new by owner 3 yrs. ago and used at one location, Palmer, Tenn.

TENNESSEE CONSOLIDATED COAL CO.
807 Commerce Union Bldg. Nashville, Tenn.
Phone: ALpine 6-6126

IMMEDIATELY AVAILABLE

B-E model 5-W dragline #609 diesel powered.
B-E model 5-W dragline #716 diesel powered.
Located in northeastern U.S.A., available for immediate inspection and delivery.
B-E model 200-W diesel dragline #735. Machine is presently located in Montana.

EXCAVATING ENGINEER

BOX 3760 SOUTH MILWAUKEE, WIS.

SMALL SHOVELS, CRANES, DRAGLINES — UP TO 2½ YDS.

DRAGLINES

30-B Bucyrus-Erie crawler mounted dragline, Cat D318 13′ long cats, 30″ treads, 60′ boom, fairlead, 1959 rental and demonstration machine, low hours, discounted for demonstration use.

22-B Bucyrus-Erie crawler dragline, Buda K-423 gas engine, 12′ long crawlers, 26″ treads, 50′ boom, fairlead, 1955 machine, excellent condition.

11-B Bucyrus-Erie truck mounted dragline, 40′ boom, Continental gas engine, fairlead, 6-wheel drive truck carrier, excellent condition. Discounted for rental and demonstration use.

Model 45 Bay City crawler mounted dragline, 45′ pin connected boom fairlead, long crawlers, 26″ treads, good condition, priced right.

SHOVELS

30-B Bucyrus-Erie crawler shovel, Cat D318 diesel engine, 13′ long crawlers, will handle up to 1¾-yd. dipper. In like-new condition, discounted for rental use.

29-B Bucyrus-Erie crawler shovel, older heavy-duty 1-yd. machine, Cat diesel engine. A real rugged machine in good condition. $2,000 in extra parts with machine. A real bargain.

375—American, ¾-yd. capacity, Waukesha gas engine, needs some work but would make a standby or extra machine at a low, low price.

11-B Bucyrus-Erie truck-mounted shovel, mounted on 6-wheel drive truck chassis, Continental gas engine, machine in excellent condition. Other attachments available to convert to hoe or crane.

LIFTING CRANES—TRUCK MOUNTED

357 Unit wagon crane, 7-ton capacity, Chrysler gas engine, machinery overhauled and machine repainted. Excellent condition and priced to sell.

14-B Bucyrus-Erie truck crane, 15-ton capacity, 6-wheel drive carrier, 60′ of HYDRAULIC TELESCOPING BOOM. Outriggers with screw jacks and aluminum floats, a like-new machine with a demonstrator discount.

"L" Quickway truck crane, 10-ton capacity, 60′ of boom and 20′ jib, heavy duty carrier, gas power, front and rear outriggers. Good condition and priced to sell.

11-B Bucyrus-Erie truck crane, 10-ton capacity, 6-wheel drive carrier, up to 70′ of boom and jib, gas power, power controlled lowering of boom. Excellent condition with demonstrator discount.

BACKHOES

30-B Bucyrus-Erie, crawler mounted hoe, 1 to 1¾-yd. dippers available, Cat D318 diesel engine, 13′ long crawlers, 30″ treads. Demonstrator machine in excellent condition offered at a good reduction.

11-B Bucyrus-Erie truck-mounted hoe, 17″ to 36″ wide dippers available, Continental gas engine, 6-wheel drive carrier, machine in excellent condition. Discounted.

Model MC-35 Schield Bantam hoe, 1956, long crawlers, 32″ treads, independent propel, Continental gas engine, overhauled and repainted, excellent condition.

HYDROCRANES

H-2 Hydrocranes, 2-ton capacity, 3 available at prices from $1,750 and up.

H-5 Bucyrus-Erie Hydrocrane, late model, gear box pump drive, 12-ton capacity upper works, 3-piece telescopic boom 50′ long fully extended. Mounted on model 80 tandem axle heavy duty Chevrolet truck chassis with 9.00x20 tires, custom cab, fenders, flaps and Western type side mirrors. Complete machine in excellent condition.

J. P. WAITE, INC.
3304 W. Pierce St. **EV 4-1900**
Milwaukee 15, Wis.

LATE MODEL

54-B Bucyrus-Erie stripper shovel, 54′ boom, 32′ tubular handle, 2-yd. dipper. 20′ 3″ long crawlers 36″ wide pads. Powered by 125-hp 440-volt elec. motor. Farval lubricating system. Includes extra parts. A real buy.

CLYDE EQUIPMENT CO.
1631 N.W. Thruman St.
Portland 9, Ore.

SMALL SHOVELS, CRANES, DRAGLINES — UP TO 2½ YDS.

Bucyrus-Erie 200-W walking dragline with 125′ boom. Cooper-Bessemer diesel engine. 6½-yd. Page dragline bucket. Spare parts available for this unit. Located in Kentucky. Detailed information furnished upon request.

Lima Model 2400, 6½-cu. yd. dragline, 120′ boom, 60″ crawlers, powered by 8 cylinder Cooper-Bessemer engine. Serial No. 32524. Located in central region. $95,000.

P&H Model 955, 2½-cu. yd. dragline-crane, 70′ boom, long and wide crawlers, powered by Waukesha diesel engine. Illinois location. $35,000.

Model 1208, 4¾-cu. yd. shovel on crawlers, electric powered 3/60/2300. 36″ pads. Includes stock of spare parts. New York location. $50,000.

2—Sampson hydraulic backhoes powered by Continental 4 cylinder gasoline engine, mounted on International Harvester Model R162 single axle truck with 6—8.25x20, 10 ply tires. $3,000 each.

Bucyrus-Erie model 22-B heavy-duty crane, dragline clamshell combination, long and wide under carriage, GMC diesel engine, 35′ boom, 20′ jib, like new condition. F.O.B. Louisville, Ky. $23,500

International model TD-14, 142 series diesel crawler tractor with Drott Skid Shovel. Very good condition. F.O.B. Louisville, Ky. $7,500

Unit model 1020, ¾-yd. shovel, powered by GMC3-71 diesel engine. #1207. F.O.B. Middlesboro, Ky. $7,500

Lorain model TL-15, ½-yd. dragline with crawlers 10′ long over-all, 8′ wide, 22″ pads, lattice type 35′ boom complete with Hendrix ⅝-yd. type LS drag bucket. Powered by Caterpillar D311 diesel engine with gas starting engine. Excellent condition. F.O.B. Evansville, Ind. $9,500

2 TON BATCH ASPHALT PLANT

Cummer 2 ton batch asphalt plant. Hot material elevator 2 ton mixer, 66″x28′ dryer. Low pressure burner, cold material elevator, 40 ton 4-compartment storage bin, 48″x 10′ Double Deck Screen, 2 ton heavy duty mixer. Weight box 4 ton capacity, Fairbanks-Morse 2½ ton aggregate scale. Fairbanks-Morse 500# asphalt scale. Complete panel board, 60 ton 2-compartment cold feed bin with feeder bucket elevator. 25,000 gallon storage capacity, 100 HP steam boiler complete. Plant completely electric. $24,000.

Write—Wire or Phone

Jim Waddell	**B. Lockwood**
P. O. Box 1705	**P. O. Box 27**
Louisville, Ky.	**Evansville, Ind.**
MElrose 7-4741	**HArrison 3-4491**

BRANDEIS MACHINERY AND SUPPLY CORP.

Bucyrus-Erie model 10-B dragline, serial No. 88585 with Buda gasoline engine, 28′ boom.

Bucyrus-Erie model 15-B backhoe, serial No. 75247, with Caterpillar model 4400 diesel engine. Machine currently being rebuilt in our shop.

Bucyrus-Erie model 38-B shovel, Serial No. 73291 with Caterpillar D13000 diesel engine with gasoline starting engine with electric starter. 13′7″ crawlers with 33″ treads. Machine currently being rebuilt in our shop.

Osgood model 200, serial No. 6147, cambered boom backhoe, ½-cu. yd. bucket and special narrow bucket. Buda gasoline engine. Very good condition throughout $5,500

Link-Belt LS-51 cambered boom backhoe with ½ cu. yd. bucket. 1952 machine. Ready to work $4,000

Unit model 1020-A, serial No. 55643, ¾-yd. cambered boom hoe, 4-cylinder GM diesel engine with torque converter, crawlers 12′-6″ long overall, with 24-in. treads. Machine in working condition. As inspected $7,500

Koehring model 304, serial No. 8624 ¾ cubic yard backhoe with International UD14 diesel engine. Working condition. As inspected $3,900

P&H truck crane, model 155ATC, serial No. 18206, 30′ boom with clamshell equipment less bucket. Reconditioned. Very good condition $14,000

Lorain model L50K, serial No. 25839, Cat D318 diesel engine, extended crawlers with 30″ treads, independent power boom hoist, rebuilt. Excellent condition. All attachments available. With any one attachment. $21,500

SMALL SHOVELS, CRANES, DRAGLINES — UP TO 2½ YDS.

Lorain model L50K, serial No. 2553, with Cat D318 diesel engine, 1-yd. shovel front, crawlers 12′-0″ long overall, air hoist crowd and digging locks. Machine delivered new in 1954. Good working condition. As inspected $10,500

Bucyrus-Erie Hydrohoe Attachment for H-3 Hydrocrane with 18″ general purpose dipper, 20″ utility dipper, 12″ narrow dipper and all necessary fittings. Excellent condition $750

Bucyrus-Erie model 15-B shovel front complete with dipper trip, chains and lagging $1,200

Bucyrus-Erie model 22-B shovel front—like new. Complete with dipper trip chains and lagging $1,750

Lorain ¾-yd. shovel front, Amsco bucket complete with dipper trip. Excellent condition throughout $1,500

Bay City model 45 ¾-yd. shovel front complete with dipper trip. Good condition. $1,500

BINDER MACHINERY CO.
Brighton St., Union, N. J.
Code 201, MUrdock 8-0060

AT DALLAS

Bucyrus-Erie 22-B dragline, S/N 114600, 40′ boom, IH UD525 engine, reconditioned. $16,500

Quickway model E shovel mounted on White tandem truck, as is $2,750

Northwest model 25 ⅝-yd. backhoe, S/N 11313, GM diesel, reconditioned ...$16,500

Northwest backhoe, model 25, S/N 19063, reconditioned $17,500

Northwest truck crane, model 25, S/N 11957, mounted on Dart carrier, good condition. $20,500

Northwest model 41 backhoe and dragline, S/N 17525, reconditioned $25,000

Insley model L dragline, S/N 7389, fair condition $4,500

Backhoe attachment for Northwest 25, good condition $2,250

Shovel attachment for TL-25 Lorain, good condition $1,500

Shovel attachment complete for LS-50 Link-Belt, as is $500

Shovel attachment for 363 Marion, 1½-yd., good condition $2,500

AT HOUSTON

Bucyrus-Erie 1½-B dragline, S/N 77257, 35′ boom, IH UD9 engine, 1,500 lbs. cwt. 20″ track shoes, as is $8,500

Bucyrus-Erie 22-B dragline, S/N 56343, IH UD14 engine, 45′ boom, Std. tracks, as is. $6,950

Bucyrus-Erie 22-B hoe, (Std. boom) S/N 102692, Cat D-318, tractor tracks, reconditioned $19,500

Bucyrus-Erie 22-B hoe, (Std. boom) S/N 10114, IH UD525, tractor tracks, reconditioned $19,500

Bucyrus-Erie 22-B dragline, S/N 119178, 45′ boom, IH UD525, tractor tracks, reconditioned $26,750

Insley model L dragline, S/N 7007, Cat D-315, 40′ boom, 30″ track shoes, as is $2,650

Lorain model TL-20 dragline, S/N 15456, 35′ boom, Cat D-4400, 22″ track shoes, as is. $3,950

Koehring model 503 dragline, S/N C1890, 1¼-yd. Cat diesel, as is at Port Lavaca, Tex. $8,750

Northwest model 25 dragline, S/N 11496, 30′ boom, 28″ track shoes, GM 3-71, as is. $3,950

Dragline boom for 22-B old style fairlead, as is $1,450

AT BROWNSVILLE

Lorain 30, ½-yd. shovel, S/N 10198, gas engine, as is $4,975

AT LUBBOCK

Bucyrus-Erie 22-B dragline, S/N 106001, 40′ boom, Cat D318 engine, good condition. $15,500

Backhoe attachment for K-12 Insley .$1,200

BROWNING-FERRIS MACHINERY CO.

Dallas, Texas	**Houston, Texas**
305 Exposition	**2619 Texas Ave.**
TA 3-8121	**CA 5-3231**
Longview, Texas	**Lubbock, Texas**
Highway 80	**2424 Clovis Rd.**
PL 9-2761	**PO 5-7455**

Brownsville, Tex.
3333 Boca Chica
LI 6-2121

SMALL SHOVELS, CRANES, DRAGLINES — UP TO 2½ YDS.

Bucyrus-Erie used 33-B shovel, Serial #15980. All in fair operating condition $10,995
American crawler backhoe, ⅛-yd. Model 100C, Serial #GS2349W with Continental gas engine, Model M330, engine #18899. In good shape $9,000
Used Caterpillar DW21, Serial #86E3386, #470 scraper, Serial #60C3095, #27 cable control, Serial #13C7235. Has been on rental 3 months only. In excellent condition. Approx. 600 hrs. $45,000
Used A-C HD11, Serial #HD11B687 with straight hydraulic blade. Machine in very good shape except for track links....$8,500
Cat #212 grader lift group for 4F4100 dozer.
Swing brake for Bucyrus-Erie 22-B. Removed from 22-B hoe attachment #120186.
Used Hyster D8L winch $2,000
Used Hyster D8N winch $1,500
New Bucyrus-Erie H-3 backhoe attachment. $2,000
Bucyrus-Erie H-3 backhoe atttachment. Has been demonstrated $1,200
Used Caterpillar D4 tractor. Serial #5T5139 with 4A bulldozer, hydraulic controls and Hyster winch. In real good shape ..$4,500
Used Caterpillar D4 tractor. Serial #7U9461 with 4A bulldozer, hydraulic controls, Hyster winch and logging canopy. In excellent condition $7,500
Also, we have a large selection of used Fleco root and rock rakes for Caterpillar D6 and D7 tractors and #955 Traxcavators.
All items subject to prior sale FOB Portland, Maine.

HOUGHTON-ARNOLD MACHINERY CO.

Main Office
59 Presumpscot St.
Portland, Maine
Dial SP 5-3121

Bangor Branch
1070 Hammond St.
Bangor, Maine
Dial 2-4666

EXCAVATORS

3—Bucyrus-Erie 38-B draglines, Cat D13000 engines, serviceable as-is.
2—Bucyrus-Erie 22-B combination hoe and dragline, one with UD14A engine, one late model with GM 3-71 engine.
1—Northwest 25 dragline, Cat D4600 engine, serviceable as-is.
1—Link-Belt LS-90 combination dragline and shovel, Cat D318 engine.
1—Bucyrus-Erie 10-B hoe, GM 2-71 engine, completely serviced, ready.
1—Bucyrus-Erie 22-BTC, 4x6 carrier, 80′ boom, 15′ jib. Late model, clean.
1—Lorain MC414, 4x6 carrier, 65′ boom, 25′ jib. Serviceable and clean.

EXCAVATOR ATTACHMENTS

Bucyrus-Erie shovel attachments complete for 10-B, 15-B, 22-B, 30-B.
New shovel attachment for Bucyrus-Erie 30-B.
Shovel attachments complete for Lima 604, Link-Belt LS-90.
Hoe attachment for Bucyrus-Erie 10-B, 20″ dipper.
Hoe attachment for Lorain TL-25, 30″ dipper.
Dragline attachment for Lima 34, 35′ boom.
Dragline attachment for Lorain TL-25, 30′ boom.
Dragline attachment for Bucyrus-Erie 120-B, complete.
15′ jib attachment for Bucyrus-Erie 38-B.
Kiesler 2½-yd. H-852 clam bucket.
Blaw-Knox 1-yd. clam bucket.
Lorain 79 or 80J fairlead.

SCRAPERS & HAULING UNITS

1—Euclid 23TDT tractor with 122W bottom dump located near Los Angeles, Calif.
2—Euclid 7TDT's with 14SH scrapers.
1—Euclid 8TDT with 14SH scraper.
2—Euclid 14TDT's with 21SH scrapers.
1—Euclid 8FDT with 58-W bottom dump 3,500 gallon water tank, pump and spray bar built to fit.
2—Euclid T8-18's with 29SH scrapers.
2—Caterpillar DW-20's, 21C series with 11C scrapers.
1—Caterpillar DW-10, 1V series with 3C scraper.
1—Allis-Chalmers TS-200, clean, serviceable.
2—LeTourneau model CR's. Repair or salvage.
3—LeTourneau model Super C's. Repair or salvage.
1—Allis-Chalmers HD-7 with GarWood hydraulic dozer, repair or salvage.
1—Allis-Chalmers HD-10 with Baker hydraulic dozer, repair or salvage.
1—Caterpillar D8, 8R series, #25 unit and 8S dozer.
1—Caterpillar D7, 3T series, #25 unit and cable angle dozer.
1—Euclid 9FDT tractor only, bargain.

SMALL SHOVELS, CRANES, DRAGLINES — UP TO 2½ YDS.

MISCELLANEOUS

1—Barber-Green 848 asphalt plant with Cleaver Brooks LFM2 steam generator, Cat 75KW generator set auxiliary asphalt pump.
1—Standard Maintenance asphalt distributor. Complete, trailer mounted, good condition.
1—Cleveland model 140 trencher 23″ wheel H & L shanks and points, IH UD9 engine.
2—Onan 30KW, 120 volt, 3 phase, 60 cycle generator sets, fully enclosed, Continental M330 engines.
1—EM 30KW synchronous package generator for 480 volt, 3 phase, 60 cycle, 1200 rpm.
1—Motor driven generator set, 120 volt DC with 225 hp motor generator control cabinet.
1—GM 6-110 engine, clutch and PTO safety controls skid base, irrigation pump unit.
1—Caterpillar D315 power unit package for Lorain TL-25. Complete with clutch and transmission, rebuilt.

THE COLORADO BUILDERS SUPPLY CO.
1534 Blake Street — Denver 2, Colorado
Phone WE 5-3571

CRAWLER TRACTORS

Allis-Chalmers HD21 with cable dozer and rear power control unit. Excellent condition.
Allis-Chalmers HD15 with hydraulic dozer and rear power control unit. Completely rebuilt and in excellent condition.
Allis-Chalmers HD11G tractor loader with a 2¼-yd. bucket. Very good condition.
Allis-Chalmers HD9G tractor loader with a 2-yd. bucket. Rebuilt and in good condition.
Allis-Chalmers HD6G tractor loader with a 1½-yd. bucket. Now being rebuilt.
Allis-Chalmers HD5G tractor loader with a 1-yd. bucket. Rebuilt and in very good condition.
Caterpillar D8-2U series with angle dozer and power control unit. In very good condition.

LOADERS AND GRADERS

Allis-Chalmers TL20D rubber tired loader with a 3-yd. bucket. In excellent condition.
Allis-Chalmers TL16D rubber tired loader with a 2-yd. bucket. This machine is only one year old. In excellent condition.
Michigan 125A rubber tired loader in perfect condition, with practically new tires and a 1½-yd. bucket.
Michigan 175A rubber tired loader with a 2¾-yd. bucket. Has a Waukesha diesel engine and is in excellent condition.
Hough Model HM rubber tired loader with GM 3-71 engine. Excellent condition.
Allis-Chalmers model 45 motor grader with a diesel engine, cab group, scarifier and 13:00x24 tires, in excellent condition.
Allis-Chalmers model 145 grader with a diesel engine, cab group, power steering, lights, scarifier, 12 ft. hydraulic shiftable mouldboard and 13:00x24 tires. In excellent condition.

CRANES AND SHOVELS

Bucyrus-Erie 22-B, ¾-yd. shovel with Cat D318 diesel engine and heavy-duty rock bucket. This machine is only 2½-yrs. old and in excellent condition.
Bucyrus-Erie H-3 Power Take-off Hydrocrane mounted on a 6x6 carrier with a ½-yd. clamshell bucket. In very good condition.
Bucyrus-Erie 10-B, ¾-yd. backhoe with Buda gas engine. Rebuilt and in excellent condition.
Quick-Way ⅜-yd. truck mounted hoe. Fair condition.
Bucyrus-Erie 15-B, ½-yd. backhoe with an International Harvester engine. In good condition.
Bucyrus-Erie 22-B Transit crane with a 38′ crane boom and a 20′ jib. Mounted on Sterling White carrier with 11:00x20 tires. Has a GMC diesel in the upper works. Priced right.
Bucyrus-Erie 22-B Transit crane with 50′ crane boom, fairlead, power controlled load lowering and 11:00x20 tires. Mounted on Sterling White carrier and has a GMC diesel in the upper works. Now being rebuilt.
Northwest #6 dragline with 60′ crane boom. Track shoes are 33′ and 15′ long overall. Has a Murphy diesel and in good condition.
Lorain ¾-yd. dragline with a new GMC diesel engine. Minor repairs made.

SMALL SHOVELS, CRANES, DRAGLINES — UP TO 2½ YDS.

MISCELLANEOUS

Warner & Swasey Gradall model M2460 with a gasoline engine mounted on a 6x4 carrier. Rebuilt and in excellent condition.
Barber-Greene model 879A blacktop paver. Gas engine. Make an offer.
Galion 8-12 ton tandem roller. Very good condition.
Barber-Greene Model 44 ladder type ditcher with new buckets and teeth. This machine has a gas engine and is in very good condition.
Ingersoll-Rand 315 Gyro-Compressor with gas engine. Has good tires and in good condition.

D. D. KENNEDY, INC.

P. O. Box 177 — Bellwood, Ill.
AUstin 7-4300 — LInden 4-5600

TRUCKS

2—Model 36-TD Euclid rear-dump trucks with Cummins engines, automatic transmissions, standard bodies and power steering. S/N 13182 and s/n 13182. .....each $17,500

SHOVELS

1—Bucyrus-Erie 88-B shovel, s/n 120713. Located at Boise, Idaho $90,000
1—Bucyrus-Erie Hydrohoe—mounted on 2-ton Chevrolet—24″ dipper. Late model—very good condition. $8,750
1—Bucyrus-Erie model 20-B, ¾-yd. Cat engine, logging heel boom, good undercarriage $8,500
1—P&H model 255A, ¾-yd. P&H diesel engine, extra long tracks, no fronts included, new in 1954 .....$7,500
1—Bucyrus-Erie 71-B shovel, GMC 6-110 engine, 3-cu. yd. Amsco bucket s/n 116168. Located at Williams, Ariz. $70,000

SCRAPERS

1—Euclid model 8TDT, 3 axle, 15½-yd. struck, Cummins engine, good condition. $15,500
1—Euclid model 14TDT, 3 axle, 15½-yd. struck, Cummins engine, good condition. $15,500
1—LeTourneau model B, 2 axle, Cummins engine, 27:00x33 tires, 18-yd. struck, late model, good condition $17,500

INTERMOUNTAIN EQUIPMENT CO.

P. O. Box 1129 — Boise, Idaho
Phone: 3-6441

BACKHOES

K Insley ½-yd. gas engine, long wide crawlers, completely rebuilt. Serial #3879.

DRAGLINES

15-B Bucyrus-Erie ½-yd., standard crawlers, 35′ boom. Serial 49464. Fair.

GRADERS

Galion 118 S/N MD17985. IHC UD-16A diesel engine, power steering, operators cab.

ATTACHMENTS

15-B Bucyrus-Erie center section 15′ long. Unused.

DOZER

Cat D9 S/N 19-A 203, complete with cable operated blade and double power control unit. This unit is in excellent condition.

RIPPERS

Three cable-operated CW rippers, pull type. Weight 9,500# each.

POWER SHOVEL CO.
4913 Massachusetts Ave.
Indianapolis 18, Ind.
Phone: LI 7-9636

Northwest 25 dragline with 40′ boom, and IHC UD-14A diesel engine. Serial #11190. Price FOB Greensboro, N. C. $8,500
Link-Belt K-580 2½-yd. shovel with Caterpillar D17000 engine. Serial #2733. Price AS IS, WHERE IS, near Greensboro, N. C. $18,500
Allis-Chalmers TS-260 motor scraper. Serial #4092. Price FOB Greensboro $20,000
Allis-Chalmers TS-260 motor scraper. Serial #4129. Price FOB Greensboro $24,000

E. F. CRAVEN CO.
Greensboro, N. C.

P. O Box 2307 — 515 S. Eugene St.

SMALL SHOVELS, CRANES, DRAGLINES — UP TO 2½ YDS.

TRACTORS

Cat D9, 18A series, No. 30 CC, 9A dozer, Ateco hyd. ripper. Completely rebuilt with new tracks.

Cat D8, 15A series with double drum CC and 8A dozers. Being checked over and rebuilt.

Cat D8, series 14A4219, 29 CC, 8A dozer, mang. pads. Running gear 60% plus. Motor rebuilt. Certified Buy.

Cat D8, late 2U series, 24 CC, 8A dozer, all guards, running gear 40% plus. Good condition $8,750

Cat D8, 2U series, with Cat double drum CC and 8A dozer. Being checked over and rebuilt. Low price.

Cat D7, 17A series D, with hyd. angle dozer.

Cat D7, 3T series, No. 24 CC and 7A dozer. Completely rebuilt, new tracks. Bonded Buy.

Cat D7, 3T-16775, completely checked over, guarded up, rebuilt rails and grousers, running gear good. 7A hyd. dozer..$11,850

Cat D7, 4T-5759, 7A dozer, and double drum CC good operating condition $7,000

Cat D6, double drum CC and Cat angle dozer, late 9U series with oil clutch. Being rebuilt.

Cat D4, series 7U33809, 44 hyd. control, 4A dozer, Hyster Hyspeed skidding winch, 5-roller frame. All guards, direct electric start, running gear rebuilt. Like new.

Cat D2, series 3J2917, 44 hyd. control, 2A dozer. Guards. $2,100 in repairs. Certified Buy $4,500

Cat #6 shovel loader. Hyd. 2¼-yd. bucket with teeth. Being completely checked over and repaired.

Cat D2 with Teale shovel loader. 5-roller non-oscillating frame. Running gear 60% plus good. Certified Buy $5,500

A-C HD5G shovel loader, 1¼-yd. bucket. Engine completely rebuilt, running gear like new. Good operating condition $6,000

A-C HD15G shovel loader with log forks and top clamp, master clutch and torque converter completely rebuilt. Running gear 70%, GM 671 diesel engine, good operating condition $14,000

IH TD18A, series TDR28564. Front CC, Hyster Hyspeed winch, angle-dozer, all guards. Running gear 80%. Good condition...$8,500

IH TD9 hyd. angle dozer, all guards. $2,400 if repair done $4,750

IH TD6 hyd. angle dozer, skidding winch that's new, all guards, running gear 60% good $4,250

IH TD6 with hyd. dozer. Good condition $2,000

Cat No. 24 CC for D8, as is $250

Cat No. 24 CC for D7, as is $250

Cat No. 24 CC, completely rebuilt. Bonded Buy $795

Cat 8A dozer, fair condition, as is $750

Hyster D89A towing winch, excellent condition. Bonded Buy $3,250

Isaacson towing winch $1,000

Hyster D7N towing winch $1,650

Garco GY54 towing winch $600

RUBBER TIRED LOADERS

Wagner DL2B forklift with forks, rubber good 60% $4,500

Hough HE rubber tired shovel loader, ¾-yd. bucket, good rubber, good condition..$3,450

Michigan 175A, 2¾-yd. shovel loader, being rebuilt.

Wagner 3,500-lb. capacity fork lift, tires 50%. Operating condition.

GRADERS, SCRAPERS, RIPPERS

A-C motor grader, tires 65% plus. 13.00x24 on all wheels. Cab, with heater, lights, scarifier, 14' moldboard. All necessary repairs made. Used 36 months since new. Bargain price.

Cat No. 12 grader, 9K series, running condition $4,000

Adams 511 grader, diesel power, 13.00x24 tires rear, 9.00x24 front. Scarifier, cab, running condition $2,500

Adams 512 grader, diesel power, 13.00x24 tires rear, 9.00x24 front. Cab with heater, defroster, windshield wiper and lights. $3,750

Grademore Slopegrader attachment for Cat No. 12. Used only one month $1,200

LeTourneau model H3C ripper. 2 teeth.

Wooldridge ripper, 2 teeth. Equipped with Cat No. 18 wheels. 2 new shanks, adapters and points. Over $500 in repairs.

Cat DW21, with scraper. Being completely rebuilt.

Cat DW20's. Being completely rebuilt.

Galion 10-ton 3-wheel steel roller, powered with Buda gas engine. Engine rebuilt. Over $1,200 in repairs. Certified Buy.....$3,000

V-type snow plow $500

SMALL SHOVELS, CRANES, DRAGLINES — UP TO 2½ YDS.

POWER UNITS AND ELECTRIC SETS

GMC 6-71 power unit, with clutch. Excellent appearance. Good operating condition. $2,500

IH UD6 diesel power unit, 40-hp with enclosed clutch and stub shaft. Good operating condition $800

Cat D4600 power unit, with clutch. Originally in shovel. Completely rebuilt including clutch. Bonded Buy $2,750

Cat D318 power unit, being checked over.

Cat D13000 diesel elec. set, 75-kw on steel base. Excellent condition.

SHOVELS, CRANES

Bucyrus-Erie 51-B shovel. Series 98049, powered with Buda 6DC1742 engine, with 2-yd. bucket. Running gear completely rebuilt. Balance of machinery checked over. Excellent condition $33,000

Northwest 80-D shovel, completely rebuilt in 1959. 2½-yd. Esco bucket.

Bucyrus-Erie 22-B crane with extra counterweight. Cat D318 diesel engine. Mounted on a self-propelled Maxi carrier. 8—14.00x 20 tires. Recently rebuilt $26,000

P & H ¾-yd. shovel, with 55-ft. crane boom and extra counterweight. Tractor type tracks, 20" flat grousers, 2 new rollers. Powered with Chrysler Industrial gas engine. 3-speed trans. Appearance good. $6,500

Lima 20-ton log loader, mounted on Mack truck carrier, with outriggers. Completely reconditioned, equipped presently with heel boom but could be rigged with crane.

Northwest model 70 with shovel front and Page 2-yd. dragline bucket, with 60' boom. Twin-Cities gas engine power. Operating condition $8,500

Northwest 25 shovel, ¾-yd. shovel front in good condition $500

Heel booms for ¾-yd. shovels ...$500 and up

MISCELLANEOUS

Gardner-Denver 125, trailer mtd. gas power, used very little since completely overhauled. Certified Buy.

Worthington Jackhammer. WS55 .....$75

Gardner-Denver UMB wagon drill, with D89D 3½" hammer. 4' power feed. Chuck for 1¼" round lug shank steel $1,200

Rex 4" water pump, 2 wheel trailer mtd. Air cooled gas power. $340 worth of repairs... .....$750

LaCrosse heavy-duty 52-ton capacity trailer. 10'x40' bed. Weight of trailer 23,050 lbs. 16 tires. 9.00x15 .....*Make an Offer*

Skeen 100-hp 1,800-rpm, 440-V 3-phase, 60-cycle, electric motor. Square D, size 4, NEMA control No. 8536A1 .....$750

Pioneer apron feeder, 6'x30", type A, 2-chain with flaired side-boards. Appears like new $1,800

Fruehauf logging trailer with 4 wheels but no tires $500

Woods Planer model 404. 6"x15" 8 knife, with profile $2,500

Steel water tank, 10' diam., 12' high, 15 gauge, 7,000-gal. capacity $400

Skeen 75-hp motor, with starter, 440-V, 3-phase, 60-cycle. G.E. 1175 rpm, enclosed Westinghouse 50 to 75-hp Dble. control Cabinet starter $600

G.E. 37-hp motor, 440V, 3-phase, 60-cycle, 600-rpm. 10" diam. x 5 C-groove pulley $375

Barber-Greene hot plant, model 839 aggregate drier, model 840-B asphalt mixer, 3 compartment, 3 aggregate feeder bin, and Pioneer No. 6 paver. Complete $33,500

Barber-Greene model 82A, heavy-duty paving load with floating cleanup scraper. 14"x6'5" crawlers, multiple speed trans. Dust housing, 9'7" pickup, notched spirals, 72-hp UD9A IH diesel power.

Barber-Greene 848 heavy-duty mixer, with 8' steam jacket, twin-shaft pugmill. Aggregate hopper. Apron feeder.

1955 Pierce trailer, 10.00x20 tires. Tandem duals. 35% rubber, 18,000-lb. axles. Water tank, air brakes, 9' overall bunks, logging trailer. FOB, Fortine $2,250

1954 GMC 630 truck and low boy trailer. Gas power. 10.00x20 rubber. 80% good. Budd wheels. Trailer 27-ton. FOB, Thompson Falls $13,000

Portable sawmill, ball bearing set ups. 50-ft. track. 52" head rig (2), 18" top saw. 5 pcs. of 10' section rolls, flat belt $1,800

WESTMONT TRACTOR CO.
Caterpillar—Bucyrus-Erie—Pioneer Gardner-Denver
150 E. Spruce — Missoula, Mont.
P. O. Box 1445

SMALL SHOVELS, CRANES, DRAGLINES — UP TO 2½ YDS.

Hydrocrane

H-2 Bucyrus-Erie on 1951 Ford truck, running condition. $2,500.

PAUL BADGLEY
1215 Bellevue Ave. — Syracuse 4, N. Y.

Esco ¼-yd. orange peel model 379. Excellent. $2,125.

American double-drum sheepsfoot roller, model AD96 with wedge type feet, 48" width drums, diameter 60" good condition. $2,000.

Model 25 Northwest backhoe, ¾-yd. Caterpillar D4600 engine, very good condition. $10,750.

Model 300 International tractor with Wain-Roy backhoe, model H-700, 12" bucket, both 1956 models. $3,750.

Model C Scoopmobile with 22' tower and pallet forks, with ¾-yd. bucket excellent condition. Chrysler gasoline engine. Capacity 4,000 pounds. $3,900.

Model 25 Bay City shovel, dragline, backhoe, combination, serial No. 6465, 1952 model, Caterpillar 315 engine, very good condition, $10,800 with any one front. Add $1,250 for each additional front.

K-12 Insley dragline with 45' boom, fairleads. Serial No. 11289, 1955 model, Buda 326 gasoline engine. Machine in good condition throughout. $8,500.

Carver KN10L 10" centrifugal pump, Continental model B427 gasoline engine, 80-hp 6-cylinder, 1,800 rpm, with 10' suction hose, 20' of intake pipe, 60' discharge pipe, mounted on trailer.

Caterpillar 933 hiloader, good condition.

GPX 24-ton transport tandem trailer, 9:00x15 tires, excellent condition. $2,950.

CONTRACTORS SUPPLY
620 E. 18th St., Kansas City, Mo.
Phone: BA 1-7788

BACKHOE & CRANE

1—Link-Belt model LS-80 crane with 50' boom, Rudomatic tagline, Buda gas engine, s/n 7074.

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Koehring model 205 shovel and hoe, ½-yd., Serial No. 5262C, powered with International gas engine #17366. 1948 model.

Model L-41 Lorain shovel with Cat D318 diesel engine. Serial No. 18918.

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Hendrix Mfg. Co. 4
International Harvester Co. ..36–37
Koehring Div., Koehring Co. ... 29
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